TQM Volume-3

Total Quality Management

in Factory Management

TQM – Hardware, Software & Diagnose

+ Cost Reduction - 6

2023a Edition

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Factory Management Institute

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Icons:

Notes: Going and Comeback to the main theme.

The third level of the Issue provides more clearness to the structure of the text to the more relevant.

Lower levels of the Issue, commonly 6th or 7th, and, pointing out necessary explanations about pictures or graphs.

UPDATING TABLE:

Date, Version-Previous & V-Next	Chapter (I..XX...)	Chapter Point.- sub-point : (Updating)

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I. Prologue

Is there a word for "*Generation Z problem*" in your country? …And, about the Generation Z, the next is the explanation of Wikipedia.

> *Generation Z (or more commonly Gen Z for short), colloquially known as zoomers, is the demographic cohort succeeding Millennials and preceding Generation Alpha. Researchers and popular media use the mid-to-late 1990s as starting birth years and the early 2010s as the ending birth years. Most members of Generation Z are children of Generation X.*
>
> *The names Generation Z is a reference to the fact that it is the second generation after Generation X, continuing the alphabetical sequence from Generation Y (Millennials).*
>
> *…*
>
> *As the first social generation to have grown up with access to the Internet and portable digital technology from a young age, members of Generation Z, even if not necessarily digitally literate, have been dubbed "digital natives". Moreover, the negative effects of screen time are most pronounced in adolescents compared to younger children. Compared to previous generations, members of Generation Z tend to live more slowly than their predecessors when they were their age.*
>
> *…*
>
> *Around the world, members of Generation Z are spending more time on electronic devices and less time reading books than before, with implications for their attention spans, and vocabulary.*
>
> *…*
>
> ***By Wikipedia***

Thus, a research company issued his report titled "*TRUTH ABOUT GEN Z IN JAPAN*[1]" as next:

> *The survey was conducted in 26 countries, including Japan, China, South Korea, the United States, the United Kingdom, Russia, South Africa, and Brazil. Creating.*
>
> *In the survey summary,*
>
> 1. *I want something that is "rapid", "real without lies", and "believable by the senses".*
> 2. *While feeling uncomfortable with social issues such as gender and sexuality, they do not want to take action on their own for fear of standing out from the crowd*
> 3. *The feeling of loneliness is increasing because it is a generation where constant connection is the norm.*

[1] *TRUTH ABOUT GEN Z IN JAPAN*: https://eng.cms.mccannwg.co.jp/wp-content/uploads/2021/08/PressRelease_ENG_TAGenZ-in-Japan_08122021.pdf

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By a research company

Now, this generation is advancing into corporations. I know we (old people) feel fear as a menace to a new generation, because of the difference in thinking. However, I think Generation Z shall be special. It may become a serious managerial theme.

What am I writing, am I? …Of course, I'm writing TQM (Total Quality Management). However, this time, I wrote about the "Thinking environment". And, nowadays, the Thinking Environment is been destroying and appears some kind of influence on corporate activity.

Recently I was feeling the incomprehensible menace against the level of young engineers of manufacturing companies. And, I understood the menace to the people. And the menace is increasing. The cause is people are gradually losing the circumstances of feeling 5 senses.

Technological Singularity in Wikipedia

A futurist predicts that "Singularity[2]" will arrive in 2045. I don't know the future level of AI. However, if happening this Singularity, one of the serious causes may be the losing the human 5 senses. I'm not trying to write about Gen Z, but the decay of the thinking environment.

This month (January 2023), in US research firm presented the Top 10 Risks for 2023. And this report raises "The rise of the digital native Generation Z". Thus, I also feel the menace of acceleration of thinking collapse. Consequentelly, my suggestion is to prepare the thinking environment in the company.

[2] **Technological Singularity** is a hypothetical future point in time at which technological growth becomes uncontrollable and irreversible, resulting in unforeseeable changes to human civilization. https://en.wikipedia.org/wiki/Technological_singularity

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II. TQM

Starting the TQM explanation? …I already wrote TQM-1 and 2. But these are like an introduction. TQM-3 is the start of the story. So, firstly I introduce the frame of this story, but very roughly there are 3 frames. The first one is **TQM-Software**. The second one is **TQM-Hardware**. And the last one is **TQM-Diagnose**.

1. TQM Software.

There are 3 Aspects: The flow of production, The Organization from bottom o top, and the System of Policy Control.

1st aspect: The flow of production.

It is from Planning New products, Product development, Production Design, Production line formation, Production Planning, Procurement & Warehouse, Production, Delivery line & Delivery to Receiving by customer & Customer production and CS (Customer Satisfaction).

In this 1st aspect, I will write about Product development and omit the first process (Planning of New Products). However, I add more details if needed.

2nd aspect: The organization from the bottom (*Gemba-workers*) to the top in the organization (executives).

I will omit this 2nd aspect because I already write the role of management, but I'd write deeply if needed.

3rd aspect: System of Policy Control.

System of Policy Control: From corporate philosophy, long & short plan, an annual policy, and annual action plan), System of "All People's Participation", Working environment (Employee engagement & Moral formulation & improvement, Thinking environment.

In the above (3rd aspect), I will omit the items of Systems of Policy Control, Systems of "All people's participation, Employee engagement & Moral formulation & improvement.

Because I already wrote these in TPM-10[3] and other columns. Therefore, in this 2nd aspect, I will write just **Thinking environment**. Anyway, I'd also, write if needed.

[3] TPM-10: https://archive.org/details/tpm10employeeengagementoilcontrol

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2. TQM Hardware

TQM has many tools. And I call such tools TQM Hardware. And the tools are as next: 7 QC tools, QC Circle, Kaizen Process Diagram, Potential Problem Matrix, QCPD (Quality Control Process Diagram), FMEA, QA Matrix, Function Deployment, IPQC (Initial Products Quality Control), QRQC (Quick Response Quality Control), Taguchi method and KJ method. I will write these in the TQM series. However, I'd add more details just in case it would be needed.

The New QC 7 tools, The QC 7 tools, and the KJ-method

I omit to write in detail about the new QC 7 tools.

I know that it is natural to write the New QC 7 tools as the TQM tools. But I don't take up this, because it is too many. Yes, too many. Rather than knowing many tools, it is important to use limited tools sufficiently. And I believe that it is possible to resolve most of all quality concerns by above tools (from 7 QC tools to the KJ method).

*The New QC 7 tools are as next: Affinity diagram method, Association diagram method, System diagram method, Matrix diagram method, Arrow diagram method, PDPC method, and **Matrix data analysis method**.*

And the QC 7 tools are as next: Pareto charts, Histograms, Scatter plots, Fishbone diagrams, Check sheets, Graphs, and Control charts.

Generally, it is said that QC 7 tools treat quantitative data, and New QC 7 tools treat qualitative data. But it is not correct. For instance, the Fishbone diagram treats qualitative information. And for instance, the Matrix data analysis method treats quantitative data even though it is one of the New QC 7 tools.

QC Circle and KJ Method in TQM-2

KJ method

I will write the KJ method (Kawakita Jiro method[4]) again. Actually, I wrote this somewhere. But once again I take up this. Because this is very useful to treat qualitative data.

New QC 7 tools have the above methods. And I don't describe New QC 7 Tools in my TQM. But it is necessary to supplement the good points of New QC 7 Tools in QC 7 Tools. I, therefore, add KJ in QC 7 Tools.

Why I take up KJ-method does. Because the KJ method and New QC 7 tools have common challenges which are to be required the creation of "causes (problem factors)" and "arrangement of order (Systemizing)". I would explain it within the short explanation of New QC 7 Tools.

[4] QC Circle and KJ Method in TQM-2: https://archive.org/details/tqm-2-introduction-2-cost-reduction-5/page/42/mode/2up?view=theater

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Affinity diagramming

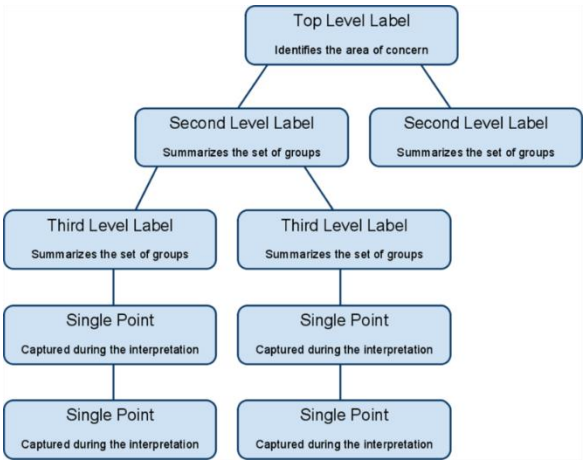
It is a method of sorting and systematizing problem factors by dividing them into groups with high affinity (relevance). You can clarify issues that were not understood by one factor and grasp the structure of the problem.

Affinity diagramming is a method of sorting and systematizing problem factors by dividing them into groups with high affinity (relevance). You can clarify issues that were not understood by one factor and grasp the structure of the problem.

And this is explained in Wikipedia next:

> *(Personally, I don't think it is correct as the upbringing. But I introduce it as general understanding (and its misunderstanding is not bad.).*
>
> *The Affinity diagram is a business tool used to organize ideas and data. It is one of the Seven Management and Planning Tools. People have been grouping data into groups based on natural relationships for thousands of years; however, the term affinity diagram was devised by Jiro Kawakita in the 1960s and is sometimes referred to as the KJ Method.*

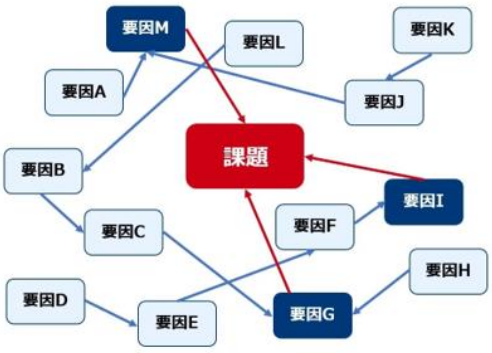
The tool is commonly used within project management and allows large numbers of ideas stemming from brainstorming to be sorted into groups, based on their natural relationships, for review and analysis. It is also frequently used in contextual inquiry as a way to organize notes and insights from field interviews. It can also be used for organizing other freeform comments, such as open-ended survey responses, support call logs, or other qualitative data.



The Associative diagram method:

It is a method of clarifying problems by logically connecting the cause-and-effect relationships of problems in which cause and effect, purpose and means, etc. are intricately intertwined. Connect factors with arrows, find causal relationships, and pursue the main factors.

The Associative diagram is represented in the figure at the right. And, **要因** ***you-in***: Cause.



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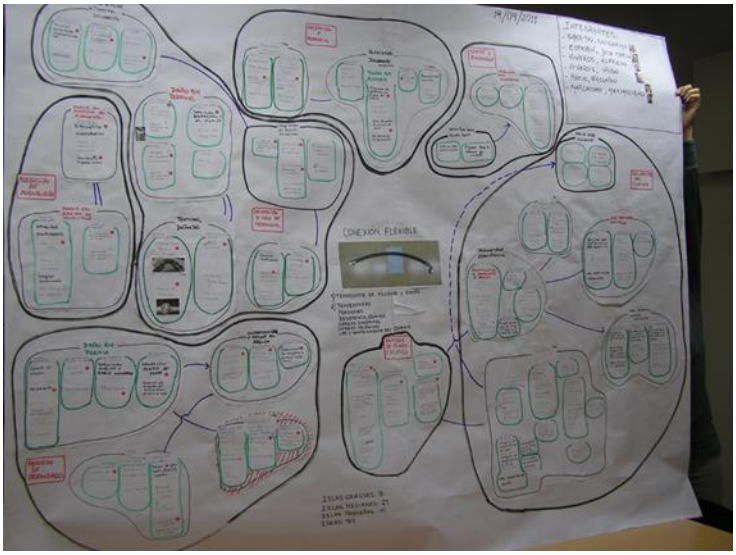
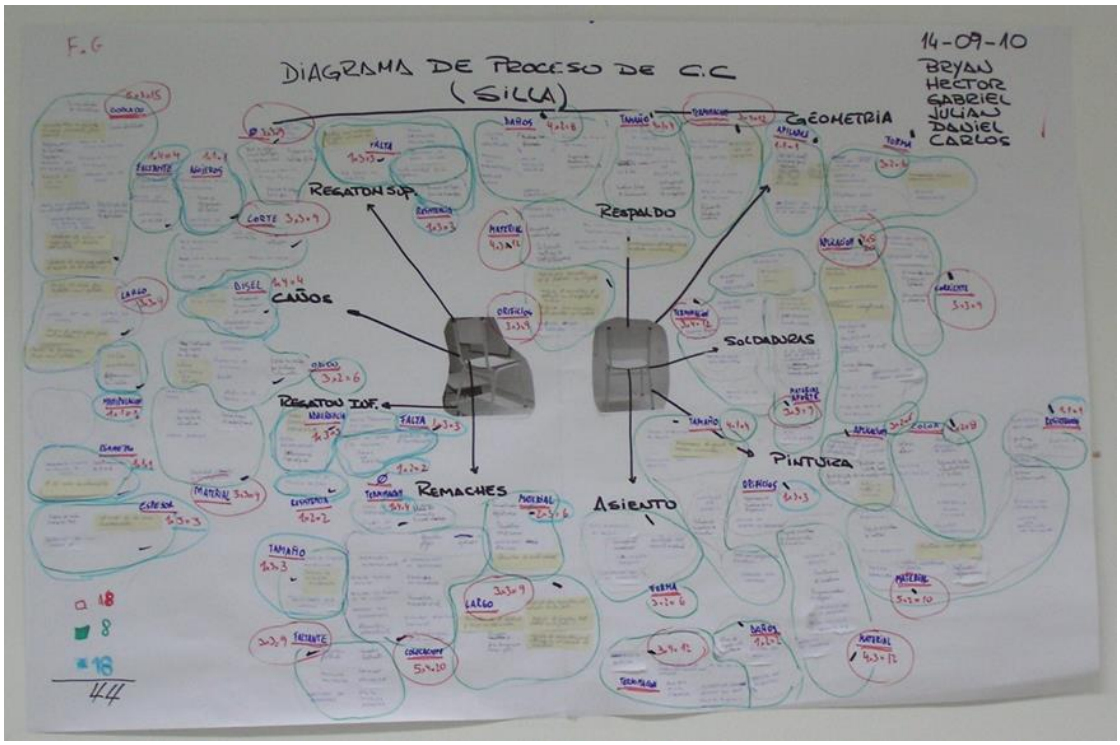
Next is an example of KJ use. And, this case is to identify the quality problem causes of main products by KJ method and thinking cause and effect.

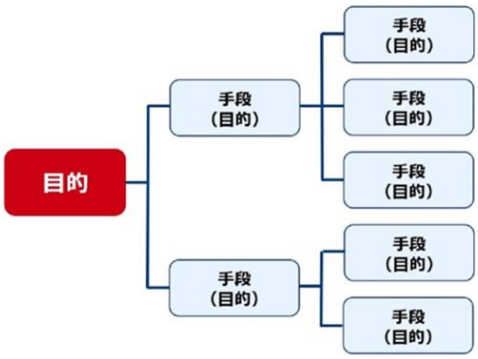
Very similar to the Association diagram method? …Yes, very much.





A system diagram:

It is a method of arranging the optimal means and methods to achieve a goal in a tree. In this method, the means to achieve the purpose are regarded as the purpose, and the work of thinking about the means is repeated many times. Through this work, the purpose and means can be developed in multiple stages, and finally, the means for execution can be reached. Thus, in a Japanese Textbook, the next image is introduced.



目的：Moku-teki: *Purpose.* ***手段：Shu-dan****: Means.*

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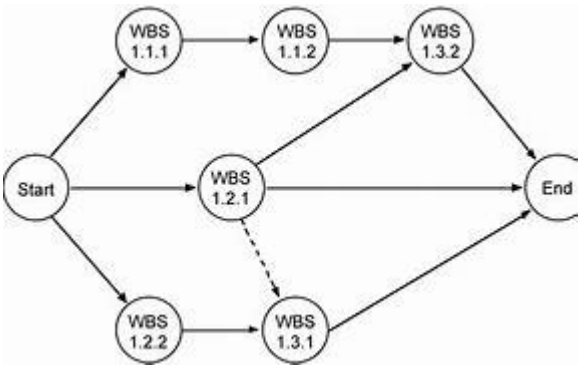
It looks like Fault Tree Analysis.

And both of them, creating ideas (means) and systemizing (ordering) in cause and effect is essential. Therefore, it also must be the range of KJ. I use KJ in Fault Tree analysis for creating ideas.

Arrow diagrams :



It is clarifying the relationship between each task and the schedule when the tasks to solve the problem are complicatedly intertwined.

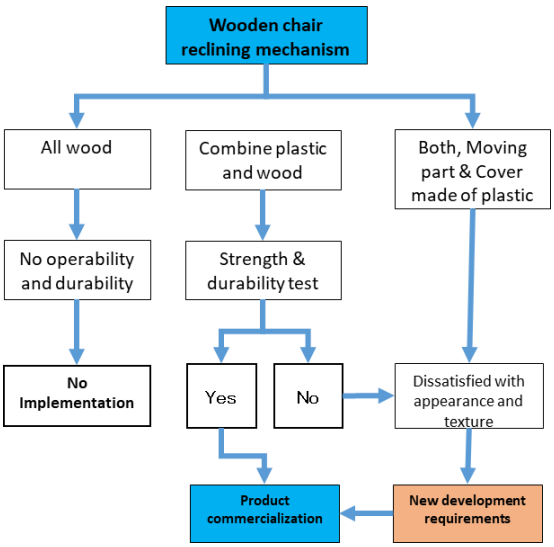
***PERT** (Program Evaluation and Review Technique) is a method that applies a project management model to quality control.*

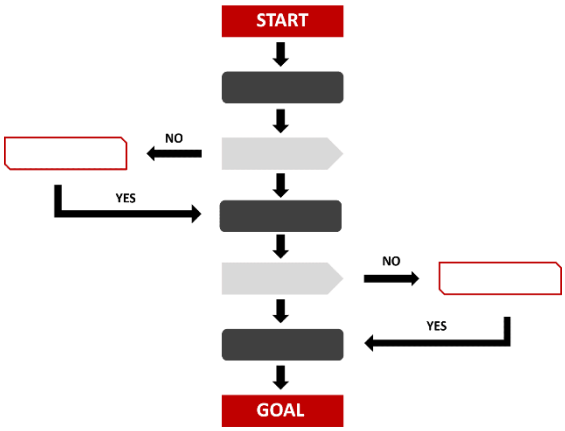
You can plan and manage the optimal schedule for the work by connecting the work with lines and describing the order relationship. Another advantage is that the entire process can be viewed at a glance, so problems in the process can be clarified before work is started.

Also, the KJ method is useful, if the processes are complex.

PDPC (Process Decision Program Chart) is a method of predicting various conceivable outcomes in advance and clarifying alternative plans even if unforeseen circumstances occur until the goal is achieved. When processes are fluid and unpredictable, having a plan in place can help you stay on track when things go wrong.

Right is just an image of PDPC, and left-below is an image of the development case, both from SNS:





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IE - Japanese Wikipedia

Work Design - US Wikipedia

I digress a little, there is an IE method so-called Work Design.

Work Design and PDPC *(Process Decision Program Chart)*

Actually, these are very similar. And, it was in the 1980s that the New QC 7 Tools were announced by the Union of Japanese Scientists and Engineers.

IE *(Industrial Engineering) has a technique called* ***Work Design****.*

The Work Design method is a method that pursues system and purpose development (function development) and leads to problem-solving and ideas. It is one of the system thinking methods announced in 1959 by Dr. Gerald Nadler of the United States. Systems thinking does not focus on parts and elements, but rather on grasping the connections between them and looking at the whole from a bird's-eye view to discover the true purpose (issues/problems). Later, together with Professor Shozo Hibino of Chukyo University, he developed a breakthrough thinking that took into account the ideal method. In Japan, Professor Seiji Kurosu of Waseda University and others improved and popularized it.

By Japanese Wikipedia[5]

The flow of Work Design is as below.

A. *Determine the theme*
    a. *Check whether the problem can be treated as a system.*
    The selection criteria are 7 characteristics: 1) function, 2) input (materials, information), 3) output (specific results), 4) procedure, 5) environment, 6) equipment, and 7) method (work performed by humans).
    And, clarify the Function of the system.
    b. *Identify the "why" (purpose) and "what it does" (function). And;*
    c. *Clarify the purpose and means of function development.*
B. *Determine the Function of the theme*
    a. *Decide whether you want to develop a new system or improve it.*
    And set goals;
    b. *Decide which objective (function) level and the goal.*
C. *Design an ideal system*
    a. *Propose an ideal system that can be realized without cost constraints.*
        i. *Creation of multiple proposals*
        ii. *Selection of viable proposals*
D. *Evaluate the system selected by information gathering*
    a. *Check the selected system components, theme functions, and so on.*
        i. *Select the system to operate*
        ii. *Determine how the components of the selected system can be combined to make it possible.*
E. *Detailed system design*

[5] Industrial Engineering (Japanese Wikipedia): https://ja.wikipedia.org/wiki/%E3%82%A4%E3%83%B3%E3%83%80%E3%82%B9%E3%83%88%E3%83%AA%E3%82%A2%E3%83%AB%E3%83%BB%E3%82%A8%E3%83%B3%E3%82%B8%E3%83%8B%E3%82%A2%E3%83%AA%E3%83%B3%E3%82%B0
Work Design [Eng] Wikipedia: https://en.wikipedia.org/wiki/Work_design

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F. Re-examination of the system design proposal
  a. System design proposal testing
  b. Creation of performance evaluation criteria
G. System implementation… And the cycle PDCA.

As you understand Work Design and PDPC are very similar. (Similar? No, it is the wrong word. Both are completely the same. Anyway) Both are based "Method of Thinking" and use a bird's-eye-view. I guess that PDPC is created with the modification or idea of Work Design.

I wish to write IE (Industrial Engineering) near future, just because my origin is IE Engineer.

Again, I don't write New QC 7 tools. Instead of these, I will write about the KJ method.

3. TQM Diagnose

I already issued the Factory Management Checklist to diagnose the factory management level. Also, I issued the checklist for Employee Engagement. Both of each checkpoints are essential for factory management and also TQM. And at this time, I would modify and add the essential elements of the "Thinking Environment". The reasons are the dramatic change of environment surrounding TQM by the development of AI, ICT, IoT, and in addition my deep worry about people's "Thinking Environment".

Therefore, I will add check items of employees' "Thinking Environment" to the Factory Management Checklist updated to 2023.

My concern? …When watching employees' attitudes and capacity of thinking and creating an idea, it is possible to say that people seem to be deteriorating these capacities. I need to say just to be sure, that the above tools which I call TQM Hardware excluding QC Circle are for pursuing facts.

QC Circle is the actual activity for quality improvement. But the other 6 tools are for just pursuing facts. Therefore, if there is no action taken it is completely no meaning.

For instance, FMEA (Failure Mode and Effect Analysis). This is the tool for pursuing potential quality problems before the beginning of production at the stage of the product's design, but it is just one-step quality problem solving and not the method of actual activity.

TQM, TPM, TPS whatever, these are the science of actual practice.

There is no meaning if not practice. For actual practice, top leadership is essential. Top leadership? …I help to introduce TQM. And the contents of my help are to teach TQM and Management ***Kata*** which is necessary to move to practice. However, sustaining the Kata and TQM practice is the job of the company, but not my duty.

A company needs to pile its history. And, he needs to grow in the piling history. But when looking company, there are cases of running idle in their piling history.

These companies have a common characteristic, which is the missing policy story (from corporate philosophy, and long & short-term plans to annual policy & annual action plans). Sometimes I hear that the lack of top leadership causes failure. However, What is the duty of top leadership? …It is to sustain and maintain the policy story. I visited and looked at many companies. And I have requested the TQM teaching.

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Thinking environment

Recently, about this decade, I had something to worry about. This is the deterioration of people's capacity against, for instance, quality improvement. And more concretely, it is the phenomenon below.

- Requiring me easily the exact countermeasures against trouble, rather than thinking by themselves.
- No achievement of the Annual plan.
- Repeated same quality troubles.
- Similar countermeasures. And;
- Bias.

The lack of searching "facts" attitude. I always tell to quality engineers to respect the individuality of each problem.

Same defect?… Yes, it is "facts (same defect)".

Same causes?... No, it is not ridiculous.

Were the surrounding circumstances such as machine condition, operator condition, material quality, machine set up condition, electricity, gas, air pressure, water, the lifecycle of a sensor, lighting, air condition, humidity environment, etc? ... Are they the same? …If you say the “same”, it is ridiculous.

There were such phenomena long days ago also. However, I feel that this phenomenon increases more recently. And I think the strongest change in the "Thinking Environment" is the improvement of IT, IoT, and ICT (Information and Communication Technology).

TQM -2: Introduction 2

Easily and Conveniently. Probably these are the biggest enemy against the deterioration of thinking & creating ideas capacity. Then I think we need to control these enemies properly. And below I would write the problems from several points of view.

Anyway, and just to be sure: There is no meaning to learning TQM if the such environment cannot be prepared.

AI (Artificial Intelligence)

In the last lecture (TQM-2[6]), I wrote the dialogue with staff representatives.

After several months, I once again was asked to visit this company. The requirement was the help of TQM activity which of course involved the ***Office-Gemba*** too. And I made the dialogue with these members.

[6] TQM-2: https://archive.org/details/tqm-2-introduction-2-cost-reduction-5/mode/2up

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Why I write this thing do? …Because I had my interest in them who had the very high intention of ***Office-Gemba*** improvement. There was a reason why they had such high intentions. It was one kind of fear against AI that may be threatening their work range. Then, they decided to start one activity MAC (Manage AI Circle) by following the QC Circle story.

Now, I introduce the continuation of the dialogue.

—For keeping the standing position of the AI user (which is not the position to be used by AI), what is the solution? —asked a member of the staff.

—AI requires correct food —I describe—. AI can exert its capacity based on the foods which are correct information and its volume is based on facts. Then, you should maintain the position of giving food (correct information by facts).

—How can we do it? —that person asked then.

—Sorry everyone —I apologized—. I'm not a professional in the field of AI. And I think you know more deeply about AI than me, don't you? …Because you established some small group activities. And I heard that some groups challenged the theme of ICT including the AI issue. May you tell me which groups?

A few members raised their hands. They were system engineers' group

—Good. Very good —I congratulated them—. Can you make a presentation simply about AI instead of me?

What is (AI Artificial Intelligence).

Next is the teaching of my son-in-law who is a system engineer. So the teaching is about two things:

- *The first one is: AI is made based on the function of the human brain.*
- *And the second one is: It is a neural net.*

Therefore, to understand AI, it is necessary to understand the work of Neural Net which is the base function of AI's deep learning.

Now, the ***Neural Net of the brain****…*

It seems that the mechanism of the brain is simple, and the model has already been published. That model is a neural network, which I will explain from now on.

How do neurons in the brain work? …Simply put, it's either on or off. And, ON means the cells are excited, and OFF means, the cells are not excited.

The arrow mark shows the pulse signal (stimulus or easily say excitement). The white and blue circle marks are the cells of memory. And the pulse signals knock out all memory of the 1^{st} layer and knock, the 2^{nd}, 3^{rd}, …, n^{th} layer in the chain with the speed of 200 ~ 300 mater/second.

At that time, the next cell receives stimulation not only from one cell but from many cells. For example, we receive various stimuli from about 1000 cells. Then, the cells receiving this

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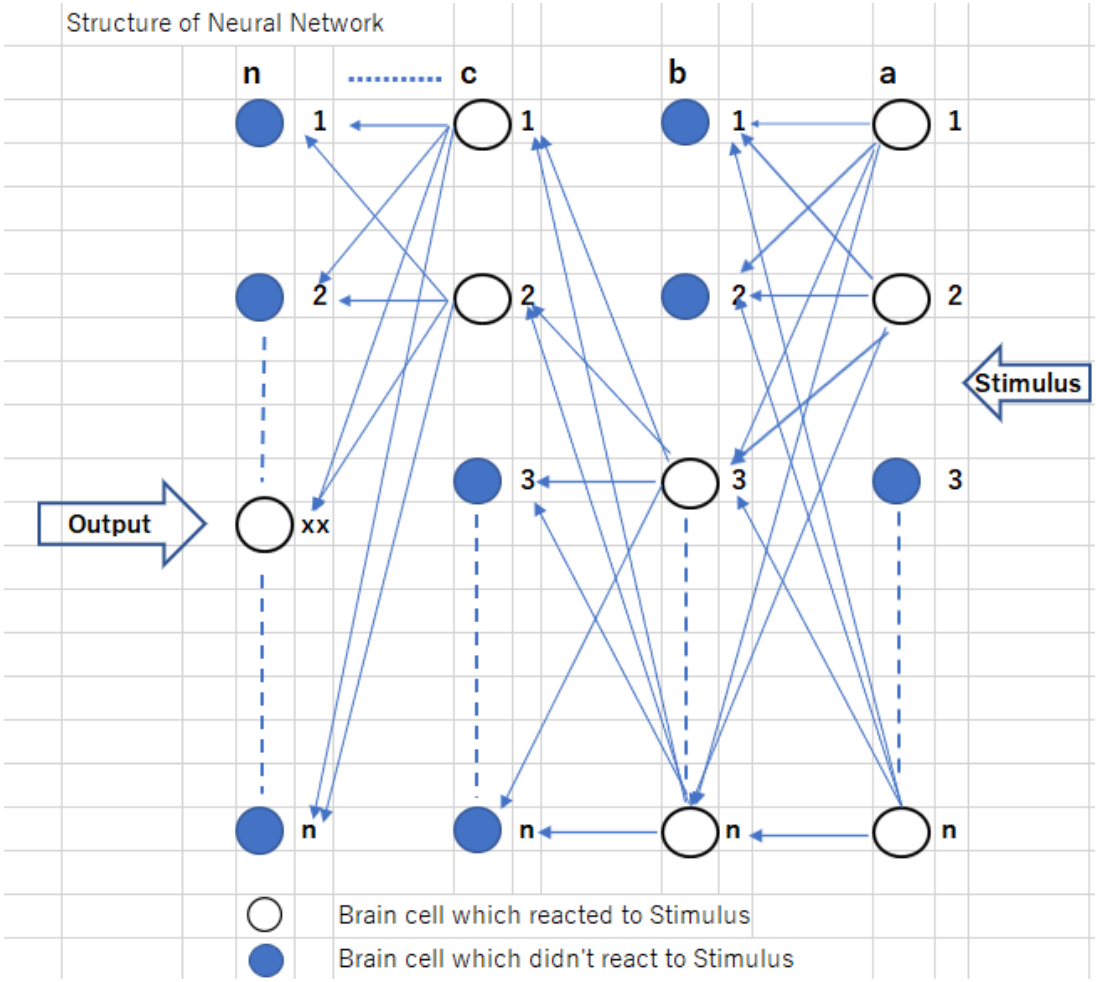
stimulus take the sum of the stimulus, and when the sum reaches a certain level, the cells receiving the stimulus react via synapses.

> ***Synapse**, by Wikipedia: In cell biology, a synapse is a junction and its structure related to nerve activity such as signal transduction formed between nerve cells, muscle fibers (muscle fibers), or between nerve cells and cells of other species. Synapses are classified into chemical synapses (vesicular synapses), electrical synapses (vesicle-free synapses), and mixed synapses.*



There are two types of synapses: excitatory and inhibitory. The important thing is that this synapse not only excites but also works negatively.

A neural network of artificial intelligence, commonly known as deep learning, is a computer that mimics the transmission of these nerve cells. Let's go back and explain this again in the above picture.

*The right arrow is the stimulus. When there is a certain stimulus, this vertical column will contact the next column. For example, if **1** in column a on the far right responds, it will be communicated that a **1** has responded to all **1** to **n** in column **b**.*

*However, it is designed to be multiplied by a constant coefficient, so even if a **1** reacts to **1.0**, only **0.**1 is transmitted from **b1** to **n**.*

*And the reaction of this column is further transmitted to the next column **c**.*

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*If the stimulus received in **b-1** to **b**-n exceeds a certain level, it reacts and transmits the stimulus to **c**1, and to **n** in the next row.*

*If the total sum of stimuli transmitted at the end of the **c** column exceeds a certain value, the nerve cell fires and responds. Of course, it does not react unless a certain level is exceeded.*

Conclusion:

1) *Outside stimulus in a round-robin to a column (a **1** ~ **an**).*
2) *And if the affinity is low level, the cell is blue marked. (**a3**)*
3) *And if the affinity is high level, the cell is white marked. (**a3**)*
4) *This cycle is repeated in the **c** to the **n** column.*
5) *And finally, to be narrowed down to **xx**.*

I questioned my son. Am I right? …He said. Maybe (He also is not an expert in this brain science field, but a system engineer.) But still, I didn't understand the system of Neural Networks. Then, as my personality, I studied this in several pieces of literature.

The things which I understood:

1) *His explanation is mostly correct.*
2) *The arrow mark is a synapse.*

The things which I didn't understand:

1) *How is the affinity to come? …What is the meaning of "so even if a **1** reacts to **1.0**, only **0.1** is transmitted from b1 to **n**" is.*

I wish to tell you is not the brain structure, but the "bias", which I think strength of affinity. Why a bias happens to do.

Why I'm writing this thing? …I think you know very well the 5-Whys. Yes, it is quite often, the effectiveness and importance are highlighted and commented on by the consultants in SNS. Actually, I saw many examples. But 5-Whys is not a sufficient tool, because of the only one side analysis.

Instead of that the Fishbone Diagram is a multifaceted analysis. It is most effective than the 5-Whys. I saw many cases of fishbone diagrams. However, however. I haven't seen a good example ever. Therefore, I can declare that you cannot do it. Why? …Your capacity for an idea is too poor. (sorry, me too. But…)

Later, I will explain why Fishbone is better than 5-Whys.

Here, I introduce one activity with this group. And for that, I suggested doing a game, which is one kind of association game.

—Everyone —I asked the group—, let's play an association game. Your allotted time is 10 minutes. And, during these 10 minutes, you write down your associated words to be not duplicated as much as possible. For instance, there is a ball pen. If the theme is this, you write down the ideas associated with the ball pen. Any ideas are acceptable.

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—Anyway —I continued—, the number is important. And writing down by following your brain. OK? It is very simple, isn't it?

—Now, the theme, or the keyword, is not ball pen. What shall we do now? —I asked figuratively— It is raining. OK. The theme is "rain". Please write down the associated ideas relating to "rain". 10 minutes. Please start.

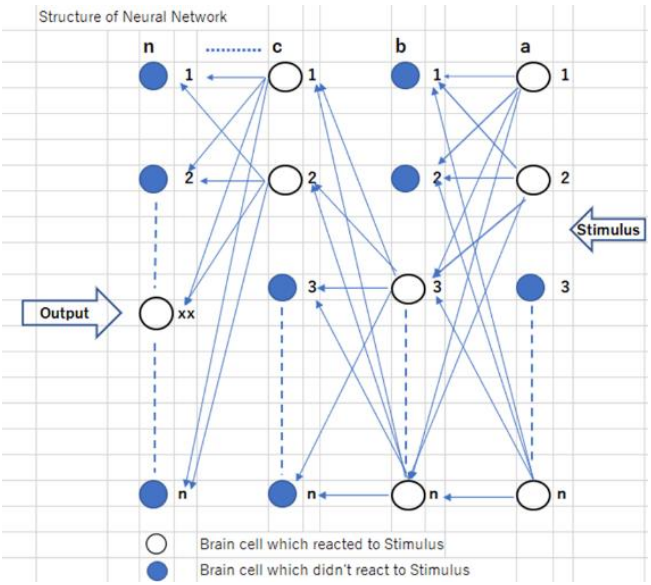
…

—OK. Everyone —I recap—. Please put down your ball pen and stop writing. Now please, count the number of ideas and write them at the bottom. And now, please let us know your number.

—23, 18, 35, 22, 27, 12 —they were detailed in the meantime I was thinking …12? …What a poor it is!.

—Somebody may help me —I asked—. And now please write down the ideas on this whiteboard. And if some (or most of the ideas are the same), write the count number.

On the whiteboard, we wrote the next series of ideas: **Umbrella**, which appears three times. **Rain-shoes**, also three times. **Disaster**, twice. … **Train**, twice. **Apple**, once. Universe, also once. In total 37 association ideas.



Now I believe you understand.

They associated 37 ideas with the word "**Rain**" (Stimulate). And these 37 are the brain cells of the right figure (even white or blue).

If you give bits of intelligence about rain in a narrow range to AI, of course, AI will consider the rain in a narrow range. If for instance giving intelligence of umbrellas, shoe rain, etc. such high score information to AI, he thinks in a very narrow range.

This situation is your (sorry) 5Whys. And only the formulaic solution is leaded.

Even so, **Rain** and **Universe**? …It was a too unique idea. Then, we made a question to the staff —Who wrote the word Universe? —I asked with curiosity and after her answer, I asked again —Why? —And her answer was about a grandma's old story she said that rain is the tears of the sky. This story was alive in the corner of her memory. Therefore, a human being is interesting.

When giving good food to AI, such diverse ideas are essential. Even so, only 12 ideas and moreover only commonplace ideas? …"?" What a poor capacity of associated ideas. Therefore, diversity is essential.

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5-Whys *vs* Fishbone diagram

Here, I will explain why the Fishbone diagram is better than 5Whys.

5Whys is just a mindset and not a system. And again, Why I'm writing such brain thinking structure?

—Your poor (sorry and sorry) capacity of idea creativity cannot make a fishbone diagram, whether 5Whys or FMEA or Fault tree analysis.

Fishbone Diagram and 5 Whys.

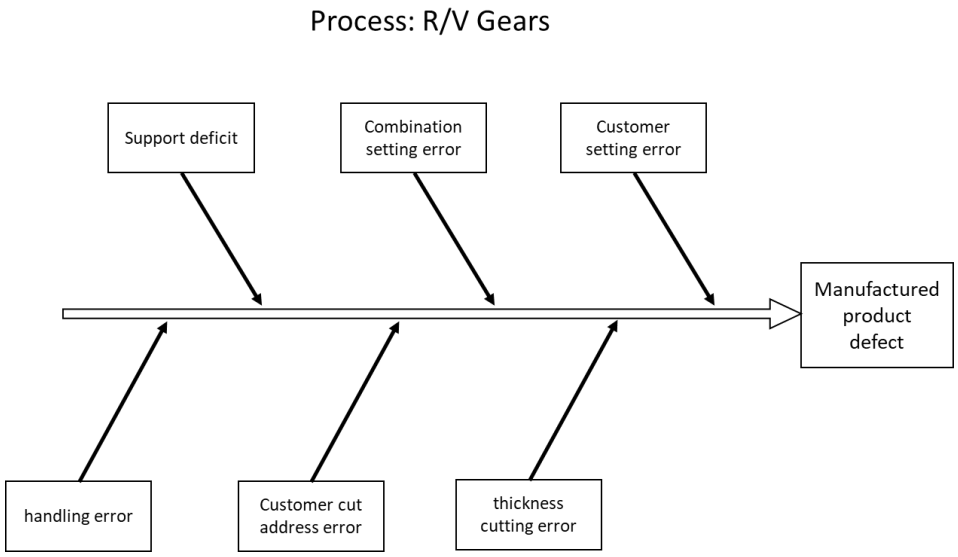
(Exactly I will introduce the Fishbone diagram and how to use it in a later description, but in here shortly.)

Example of Fishbone Diagram (Fishbone activity by a QCC Group)

Kimura's group tries to solve another problem in the speed reduction gear process that causes many defects in the finished product.

According to the information from the inspection and analysis group, the first causes of the defect are: Tooth joining error, combination adjustment error, tack deficiency, cutting thickness error, tooth direction error, and handling error.

Then they decide on the skeleton of the Fishbone Diagram as next:



Then the group leader brainstormed with his members and the following ideas were supposed:

*For example, **Tooth Gathering Error**: Tack down too far, Find Gear Opposite Rotation, Clamp Tighten Error, Limit switch Setting Error.*

Tooth Gathering Error is the first classification of the causes and the 4 causes of the Error are the second classification causes.

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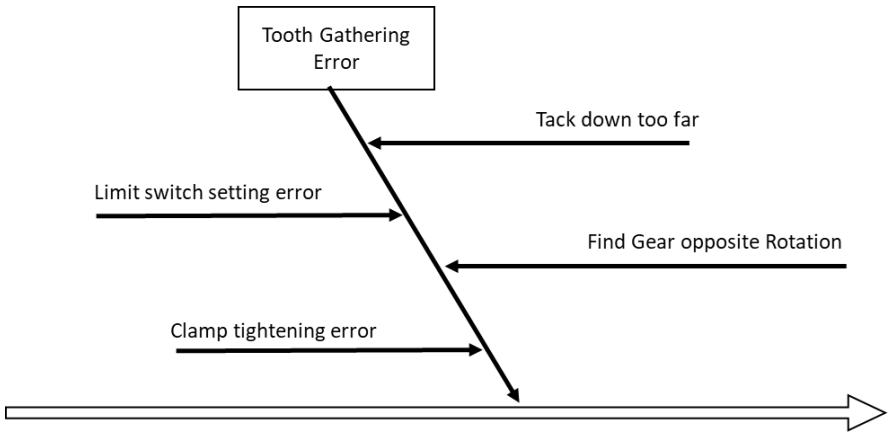
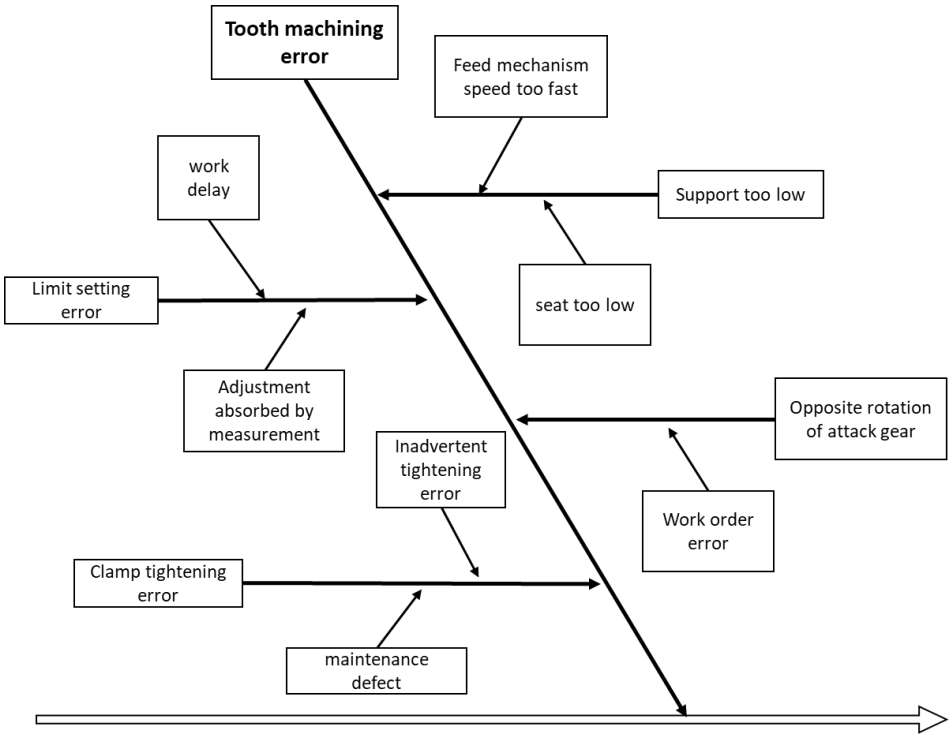


In addition to the second-ranking causes, the group supposed the following third-ranking causes

For example:

- *Tooth joining error (first class cause)*
- *Going down too much from tack (cause of the second classification)*
- *Fast speed of feed mechanism, and*
- *Low scaffold (third class cause)*
- *Opposite gear rotation to find*
- *Work Order Error (Third Rated Cause)*
- *clamp tightening error*
- *Work delay Being absorbed by measurement (as the third cause)*
- *Limits which setting error*
- *Maintenance defect, Forget set*



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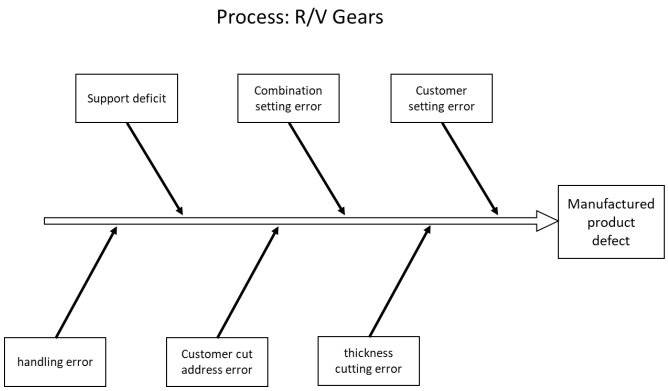
And the same work is done for: Combination Fit Error, Tack Deficit, Thicken Cut Error, Tooth Direction Error, and Drive Erro. And the order is:

a) *Brainstorming and writing down ideas with/without criticism*
b) *Group the ideas with the consideration of the classification of causes*
c) *Annotate ideas as rib*

As the words are written, the possibility for general employees is thought

I haven't really seen good Cause and Effect Sheet activity with (for example) Quality Control Circle (QCC) excluding my groups. All QCC groups use it, but only as decoration.

Truth: This order is difficult for general employees, The causes of the first, second, third, fourth, and fifth classification. This process, why, why, why, …is difficult.

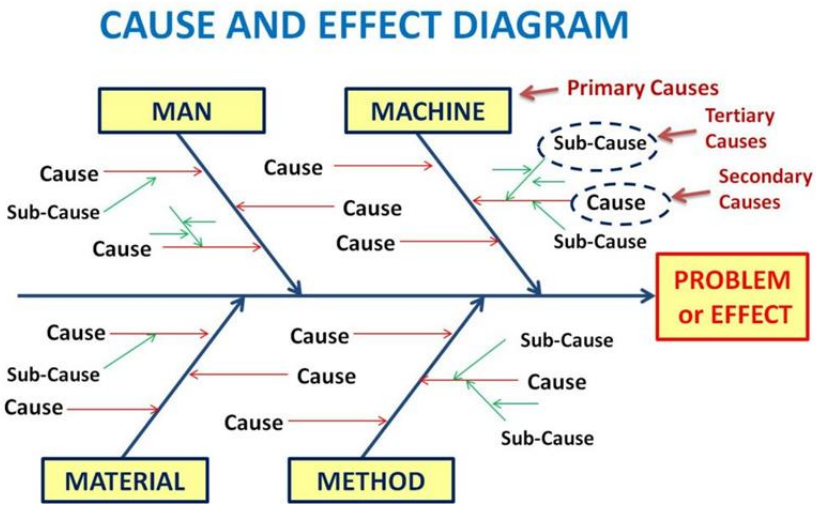


Now you understand why Fishbone is better than 5Whys.

This example shows the 6 stems (first expected cause). But normally 5Whys does for just one stem. Of course, 5 Why is also very useful, if you consider the first classification stems and do 5 Whys for each stem. But you don't do so. Another good point of Fishbone is that it is one of the bird's eye view.

Again, why I'm writing such brain thinking structure is. And your poor (sorry, and sorry again) capacity of idea creativity cannot make a fishbone diagram, even 5Whys or FMEA or Fault tree analysis.

Next is an example of Fishbone in a SNS. A good example:



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Ishikawa Diagram Wikipedia [Eng]

Ishikawa Diagram of Accident investigation: Zero Accidents: TPS Total Preventive Safety Book. Edited version

Ishikawa Diagram of Accident investigation: Zero Accidents: TPS Total Preventive Safety Book. Handmade edition

5-Whys Wikipedia [ENG]

Ishikawa Diagram in Wikipedia[7]

Ishikawa diagrams (also called fishbone diagrams) are causal diagrams created by Kaoru Ishikawa that show the potential causes of a specific event.

Common uses of the Ishikawa diagram are product design and quality defect prevention to identify potential factors causing an overall effect. Each cause or reason for imperfection is a source of variation. Causes are usually grouped into major categories to identify and classify these sources of variation.

The defect is shown as the fish's head, facing to the right, with the causes extending to the left as fishbones; the ribs branch off the backbone for major causes, with sub-branches for root-causes, to as many levels as required.

Ishikawa diagrams were popularized in the 1960s by Kaoru Ishikawa, who pioneered quality management processes in the Kawasaki shipyards, and in the process became one of the founding fathers of modern management.

The basic concept was first used in the 1920s, and is considered one of the seven basic tools of quality control. It is known as a fishbone diagram because of its shape, similar to the side view of a fish skeleton.

Mazda Motors famously used an Ishikawa diagram in the development of the Miata (MX5) sports car.

Advantages

- *Highly visual brainstorming tool which can spark further examples of root causes*
- *Quickly identify if the root cause is found multiple times in the same or different causal tree*
- *Allows one to see all causes simultaneously*
- *Good visualization for presenting issues to stakeholders*
- *Easily find a solution for the root causes*

Disadvantages

- *Complex defects might yield a lot of causes which might become visually cluttering*
- *Interrelationships between causes are not easily identifiable*
- *Can mistakenly repeat the same cause due to the complexity of the causes*

Wikipedia

5 Whys

Five whys (or 5 whys) is an iterative interrogative technique used to explore the cause-and-effect relationships underlying a particular problem. The primary goal of the technique is to determine the root cause of a defect or problem by

[7] Ishikawa Diagram [ENG]: https://en.wikipedia.org/wiki/Ishikawa_diagram
El Diagrama de Ishikawa [ESP]: https://es.wikipedia.org/wiki/Diagrama_de_Ishikawa

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repeating the question "Why?" five times. The answer to the fifth why should reveal the root cause of the problem.

The technique laid out by Taiichi Ohno is to ask "Why?" exactly five times, to find exactly one root cause. In practice, this is a poor root cause analysis tool, as root cause analysis is rarely linear, there is rarely a single root cause, and rarely are there exactly five issues that point to a root cause. To alleviate this, the Five Whys are sometimes misinterpreted to ask "Why?" more than five times and to have multiple starting questions. There is no formal literature published on these diverging interpretations. Some suggest abandoning the five whys entirely for this and other reasons. Even when the method is closely followed, the outcome still depends upon the knowledge and persistence of the people involved.

Common uses of the Ishikawa diagram are product design and quality defect prevention to identify potential factors causing an overall effect. Each cause or reason for imperfection is a source of variation. Causes are usually grouped into major categories to identify and classify these sources of variation.

And It is quite clear that the Fishbone diagram is much better than 5Whys.

Very near future, such 5-Whys or Fishbone will be made by AI.

AI and the human brain are different. AI is necessary to be given information, by a human even though he has the function of deep learning. On the other hand, the human brain has still the capacity to increase by 97% (There is a popular belief of only 3 % brain), but has the characteristics of "bias".

So, where the "bias" comes from? ….And, it is simple and is from non-diversity (so-called flexibility) in your brain.

Statistic Quality Control (SQC)

By the way…

In this series, I will write Statistic Quality Control (SQC). And, the main purpose of Statistical Quality Control, is the use of statistical methods in monitoring and maintaining the quality of products and services.

For instance, one method, referred to as acceptance sampling, can be used when a decision must be made to accept or reject a group of parts or items based on the quality found in a sample. A second method, referred to as statistical process control, uses graphical displays known as control charts to determine whether a process should be continued or should be adjusted to achieve the desired quality.

I think the above explanation is a little old as a thought. Because all things are passive. Therefore, I will add the word next. SQC must be used for finding solutions actively. Thus, there are famous QC-7 tools in SQC:

1. *Cause-and-effect diagram (Fishbone diagram)*
2. *Check sheet*

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3. *Control chart*
4. *Histogram*
5. *Pareto chart*
6. *Scatter diagram*
7. *Stratification*

Excluding the first one, which is the Fishbone, all other 6 tools are for gathering facts (data). And the facts gathered should be used for analysis and finding a solution. And the facts gathered and analyzed data must be used for a deeper piece of facts (supposition) by, for instance, Fishbone.

The sense of felling

Now, going back to the question of these staff in the dialogue… The question was: For keeping the standing position of the AI user (which is not the position to be used by AI), what is the solution? …Even blue or white marks are brain (memory) cells.

Then, the suggestions are:

1) **Giving good food to AI. If given bad food (wrong information), it is necessary to teach it is wrong.**

There are many facts against one phenomenon. But unfortunately, for instance, QA engineer finds very limited facts by fixed ideas. If we give just such food to AI, AI will work in a limited range, even having deep learning functions. Of course, the solution by AI will be not sufficient or biased.

AI is clever. AI tries to think multifaceted in a limited range. You know AI tries to think with all information that he has on a round-robin.

Your duty is to expand AI's information range with good food.

Now I need to apologize to you, because I'm not a professional of detail office work, but production process. I know very well only the design deployment to make a product's design. But I don't know the office work and procedure of for instance accounting, or HR.

Therefore, you need to think about how AI is used by yourself. So, how you can do?

For your reference, there are steps to use AI in your work process. **First step**: Data gathering (to use for deep learning). **Second step**: Making a model of learned information. **Third step**: Programming to weave in your job.

First step: Data gathering. And probably, it is most difficult for you.

For instance, the job of design deployment (from customer's design to in-house production design). And the gathered data contains design mistakes: Location (customer's drawing), kinds of mistake in products and by person, problem found a location (self-check, in-house production Gemba, customer's production process, consumer), problem degree by cost and reputation, and product function. Working time, working volume by person, degree of urgency, mistake work contents in the procedure, used device.

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So, as you understand, what kind of for instance assumed problems, defects, or other things do you gather as the data?

You need to assume the things and the methods of gathering data. Moreover and basically, you need to assume how to use it and for what you use it. The above example (design deployment) is an assumption of avoiding design mistakes by manual recording. Of course, this data of manual records is taught to AI. Design deployment work and gathering data cannot be like the production process which can be used sensors, and cameras for getting data on temperature, acceleration, pressure, pictures, etc., and data gathering with IoT.

Now please think by yourself, about how to and what's the purpose and what kinds of data.

As **Second step:** Making a model of learned information. And the **Third step:** Programming to weave in your job. However, I need to say sorry these are not my professional field. Consequentially I omit.

2) Do as AI does.

AI tries to do multiple thinking (as round-robin). But you cannot. Therefore, my recommendation is a meeting with plural members in diversity, and never do it alone. (Assumption of rain. Only 12 associated ideas? What a poor imagination you are!)

3) Another is the training of looking at things in multifaced.

Daily thinking training. Rain-Universe and what is the associated idea?

*Here, I will introduce a book titled "**Silent Spring**" written by Rachel Luis Carson*[8] (May 27, 1907 – April 14, 1964). *She was a biologist who was born in Pennsylvania, United States, and who denounced environmental problems in the 1960s. As a fish biologist for the U.S. Department of the Interior Fish and Wildlife Service, she studied the natural sciences.*

She wrote a worldwide famous book titled to be "Silent Spring". She appealed to the crisis of destruction of nature in her book. But I remember her by another meaning and word. Thus, next are my memories.

Rachel Louise Carson Wikipedia [ENG]

Her famous 10 words:

(1) "Knowing" is not important as half as "feeling".
…
(3) I want children all over the world to have a "Sense of Wonder" that will last a lifetime.
Sense of Wonder: "Sensibility to be amazed by mystery and wonder".
…

[8] Rachel Carlson, Wikipedia [eng]: https://en.wikipedia.org/wiki/Rachel_Carson
Rachel Carlson, Wipipedia [eng]: https://es.wikipedia.org/wiki/Rachel_Carson
'SILENT SPRING' in Internet Archive: https://archive.org/details/fp_Silent_Spring-Rachel_Carson-1962

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(6) *Unfortunately, many of us lose our clarity of insight, our intuition for the beautiful and the awe-inspiring, and sometimes lose it altogether before we reach adulthood.*
…

In her book, Carson repeatedly stresses the importance of using all five senses to perceive the wonders, splendor, and wonder of nature. And says as next: "Most of us perceive most of the world around us through sight. However, there are many times when we do not really see anything even though we see it".

Silent Spring - Rachel Louise Carson in Internet Archive – Borrow it… [eng]

Once again, why I'm writing and introducing such a thing? …For doing quality improvement with Fishbone, FMEA, etc., it is required the capacity of imagination and the creation of an idea.

This company's ***Office-Gemba*** groups desired to know how to use AI and win to it. Moreover, they wished their reskilling to adapt to future ***Office-Gemba*** conditions.

And one of the essential skills to win AI is to demonstrate the Right brain capacity.

Again, I come back to the dialogue with the staff groups… However, in my heart, I was thinking: "*Even so, only 12 ideas, moreover, only commonplace ideas??? …What a poor capacity for creating ideas*."

—You wish to win AI —I express my concerns—, wish to keep the position of not being used by AI but to make full use of AI. I spoke the stories of 5Whys and Fishbone. In probably very near future, these are made by AI which at least AI can do round-robin thinking…

—On the other hand, you cannot make the round-robin thinking in your brain, even though you may have abundant brain cells and knowledge. No, you don't even have so many brain cells of knowledge yet, because of your age and experience.

— I was asked to make a lecture on TQM. And TQM has some fundamental tools such as the QC 7 tools, FMEA, FTA, Function Deployment, etc. However, you cannot make FMEA, or FTA (even 5Whys, Fishbone). In this way, Quality improvement is a drama. Associated the idea of "rain" just an umbrella? …Only 12 associated ideas by "rain"! …What a poor imagination and inspiration it is! …It is impossible to make a drama with such a poor capacity for creating ideas.

A real story *(In a Japanese factory).*

This factory had a quality problem with precise products. And as usual, the quality department made a 5-Wys analysis and concluded a suspicious cause. And of course, the countermeasures were implemented. However, the same quality problem has occurred. Just then, an operator spoke to the quality engineer.

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The cause may be a vibration, May it not be? …Vibration? …Vibration, … Then, both shouted:

—Shinkansen!!

*Actually, this factory stands beside the **Shinkansen** railway at a several hundred meters distance. And then, the quality engineer put the vibration measuring meter into the machine and recorded the vibration.*

*They found a fact that the faint vibration by **Shinkansen** caused the resonant vibration with the machine, and moreover, found that the resonant vibration caused the repeated defect. And of course, based on the found fact, the countermeasures were implemented and stopped the quality problem.*

—Everyone —I asked everyone again—. Again, only 12 associated ideas?! …Is it possible to come up with such a very faint vibration and the resonant vibration? …Before doing the TQM lecture, I checked the past quality report and countermeasures to quality problems of the assembly process. Thus, the contents countermeasure ideas were training & education, re-inspection by the operator, Poka-Yoke, etc. And the results were no improvement in several years, even though there were fluctuations…

—Poka-Yoke, 5Whys, etc. You know very well the words and means. But you cannot come up with the ideas of Poka-Yoke if you have a very poor capacity for creating ideas: **1)** Giving good food to AI, **2)** Doing as AI does, **3)** training of looking at things in a multifaceted. But as you already understand, you need to train your brain.

—Is it difficult? —As asked figuratively— …No, not at all. You can do it very easily. You use only 3 % of your brain capacity (it is said in general terms. But this theory has no scientific background. But it is, unfortunately, true that recent people pursue convenience and has the evasive trend of thinking.). Please discuss this theme (How to train a brain) in groups. The limited time is 30 minutes. Please start…

…

—Reading a book —they began to name some thinkings—, A Good movie, Exercise, Stroll, Picnic, Debate, Music, Hobby, Mountain-climbing, Flowers, Bird Watching, Forest, Stream flow, Games, Having doubts, Investigating the doubts, Listen carefully, etc.

Indeed, they had very wholesome ideas, but…

Giving good food

In TQM-2, I described Alpha Go[9] which is used for both teachings by humans and self-study with deep learning.

[9] *Alpha Zero [eng]: https://en.wikipedia.org/wiki/AlphaZero*
Alpha Zero [esp] : https://es.wikipedia.org/wiki/AlphaZero

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TQM -2: Introduction 2

And when looking at the tide of AI development, I believe the specialized type is the main tide in the manufacturing industry than the general-purpose type (AGI; artificial general intelligence).

And one example is this Alpha Go which is required teaching work, even though it has the strength of deep learning.

And these deep neural networks perform supervised learning by human Go professionals and reinforcement learning through self-matching, and it seems that the learning of Go will progress by combining them.

And my surprise was the appearance of Alpha Zero. It seems that Alpha Zero has won all 100 games against the previous Alpha Go.

The biggest difference between Alpha Zero to Alpha GO is "Alpha Zero can do the independent learning by himself".

Until now, human game records were read into AI, so the strength of AlphaGo was just an extension of human knowledge. However, Alpha Zero only learned the rules of Go. After that, it achieved its own growth in games between AI's, and devised the strongest way to beat them.

I said that within a decade to 2 decades, our working conditions will be changed dramatically. But it may be wrong. Within a more and more early period, the epoch may come.

And it may not take long for AI to replace the work you are currently in charge of.

Isn't it essential for not only this stave group but also for us to acquire AI literacy and think about how to face AI? …And the essential terms for this staves group, and are "reskilling" and activation of the right brain.

—Do you have any questions? —I asked figuratively because I didn't expect any answers—. This item is not a solution for this theme but is the theme itself. I introduced the word "Sense of wonder" by *Rachel L. Carson*. And again, let us consider her word "*Sense of Wonder*".

—I think it is the meaning of that: This is first, *Sensibility*. I believe that this sensibility is not only about nature but also about all things in society. So, everyone —I call their attention again—, the beginning of this dialogue was the executives' worry about the difficulties of TQM introduction in the ***Office-Gemba***. And you expressed that you couldn't find the solution in TPM.

—Then the executives gave you the keyword of AI —I continued describing the facts—. And you decided to use AI to improve your office work process. In your mind, there is a concern of to be deprived of a job by AI and a worry about how to win or fully use AI.

Alpha Go [eng]: https://en.wikipedia.org/wiki/AlphaGo
Alpha Go [esp]: https://es.wikipedia.org/wiki/AlphaGo

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—My concern also is the same in the sense that you cannot make quality improvements. Both (AI and quality improvement issues), the root is the same, and are people gradually losing brain ability. If we cannot stop the root cause of losing brain ability, we cannot feel the enjoyment of quality improvement drama. Of course, you lose your job itself caused of the replacement to AI.

—You listed items on how to train the brain. But, your thinking ability or using your brain, is still very wholesome —I said tinking it is just flattery and I am worry about it.

Is there a relation between TQM introduction in ***Office-Gemba*** and AI use? …No, there is not. However, one point is the same. Thus, TQM will be at risk, if you couldn't keep or improve your brain ability and the capacity of creating ideas. AI use also the same. If you couldn't keep or improve your brain ability, you will lose your job.

—Once again everyone —I pointed out—. The first purpose of this dialogue is how to implement the TQM concept in ***Office-Gemba***. And the executives suggested you improve the **Office-Gemba** by AI use based on your company's middle-term strategy which has the item of AI use.

According to another report, almost 50% of jobs by humans will be replaced by AI in this decade or 2 decades. Within these one decade to 2 decades, human work contents will be changing. However, quality is still a top priority issue for the manufacturing industry. TQM also will be required to change. No, this word is not suitable. Rather than changing the traditional methods, an additional new concept will be required in the condition of AI, IoT, and RPA. But the basic condition which is the capacity of creating ideas will be the same. And humans will be required to shift to the creative job.

The labor market in 2030

Yesterday (2020 Oct), the above title (Labour market in Japan) was introduced by a Japanese TV broadcast by the Mitsubishi Research Institute.

The labor market in 2030 (estimate) Unit: thousand

Surplus	**4600**	**Shortfall**	**4400**
Clerical work	1300	Service work	1400
Sales	900	Transport, cleaning, and packing	1000
Factory, production jobs	800	Highly specialized skills jobs such as IT	700
Others	xxx	Others	xxx

As you understand, the map of the labor market is becoming to change very rapidly with AI, IoT, ICT, and RPA (Robotic Process Automation), even though it is just an

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estimate. Especially, the surplus of Clerical work is remarkable. Therefore, it is understandable the staff group has their fear of losing their job in replacement to AI.

Then, currently, the word which is "reskilling" is shouted loudly. To adapt to the labor market, everybody needs to do reskilling.

Going back to the dialogue with the staves' group.

—So, what can we do? …You wish to win AI or to master it. You wish to keep the position of AI users rather than be used by AI. And, You have already listed the effective items which are: Reading a book, Watching a **Good movie**, Working out, etc. But the still important item is missing… You are losing human nature in your daily life gradually.

In my heart, I felt I'm in a trouble, because of customer companies losing the capacity of TQM, despite their expressing their desire to do it. I wish to teach it but don't want to fail.

—I tell you 3 things. The first one is **Convenience and "Mobileholic".**

1- **Convenience and "Mobileholic":** This item is the most injurious item. What are the most injurious items for the creative brain? …These are: Computer, Twitter, Chat, E-mail, Smartphone, etc. (Recently additionally remote work caused by the COVID issue also added). These are very convenient and should be used. But my concern is you may be a "M*obileholic*".

—Please listen everyone. When I made a lecture for the young generation, recently I had one anxious. It is that they (you) are curious to listen to the solution rather than thinking by themselves —I told them in the meantime I was thinking that although people in their 30s and 40s belong to the younger generation for me…

—The trend is to wish to know the solution easily and fast. They (you) are curious to know more easily than using their (your) brain. They (you) use a Chat or Twitter rather than writing a sentence. And the young generation (you) tells to me that it is a waste (***Muda***) to spend time to make communication. The world is becoming convenient more and more. And on the other hand, you are losing something. Therefore, I don't teach a solution and let you think it by yourself…

—Now, is convenience bad? …No, not at all. It is a good thing. If you could create spare time and if you could use it for more creative things. But unfortunately, the young generation's (your) trend of time using is worse and some of them to be like as "*Mobileholic"*…

—TQM, AI use…. All these require you to use your creative brain. Here, a new enemy is happening. This enemy is also one part of ICT. It is the so-called Metaverse.

2- **Metaverse:** Last week (2022. Sept. In the situation of the 7th wave of COVID), I saw a commercial on TV: Dispatching one's own avatar to a tourist area and making sightseeing through the avatar. Moreover, the specialty food is delivered at the time. Then the family can get the feel of sightseeing in the virtual space. It seems popular but Seeing and tasting are only 2 senses in the 5 senses. I felt that gradually human nature is destroying.

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By the way, Why people wish to climb mountains do? …In the middle of climbing, there is heavy work. And people think why we heavy work would do. Then, when achieving the top and can see the beautiful spectacle, we can gain not only see the spectacle but also gain a sense of accomplishment and self-confidence.

Meta will become one of the business trends. I never deny it. But please never forget that a human is an animal with 5 senses (or 6 senses). If you don't use these you will not be able to win AI.

Since we were only talking about serious things, let's take a little break here.

A break…

Please ignore this column, if you are busy and don't like it.

I believe that a human gradually is losing his nature. At present, there is a popular game in Japan which is AtsuMori (Atsumare Doubutsu no Mori) by Nintendo.

This game is also one VR with using an avatar. It is very much interesting, even for an old person (like me). The contents are as next, very shortly.

What kind of game is "Atsumare (Gather) Animal Forest"?

The next stage is "Uninhabited Island"

Players will participate in the "Uninhabited Island Migration Package" planned by Tanuki's (raccoon dog) new company "Tanuki Development" and will migrate to an uninhabited island.

Choose destination from patterns that you like.

Let's make a character (avatar) with the appearance you like and start living on a deserted island full of nature.

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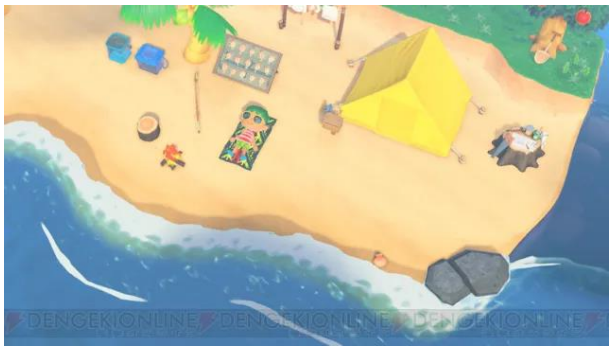
The player's tent can be put up on the beach as well as on the flat ground. In addition, in this work, you can decide the house of the animal residents and the location of the facility by yourself.

"Tanuki Development" will provide you with a tent and a smartphone, and you will start living on an uninhabited island.

At the information desk in the plaza, you can consult about living, purchase daily necessities, and buy unwanted items.



Furniture can be displayed indoors as well as outdoors. You can also finely adjust the position of the decoration, making it easier to lay out as you wish.

…

If you don't know what to do on a deserted island, you can earn miles with "Tanuki Mileage".

…

“Tanuki Mileage” offers suggestions on how to live on uninhabited islands, such as fish fishing.

…

As the time, weather, and seasons change, the scenery of the island changes in various ways. Depending on the time and season, the animals that visit the island and the insects and fish that can be caught also differ.

You can also choose the Southern Hemisphere or Northern Hemisphere depending on where you live.

…

Trees and weeds grow as much as you want on the island you just moved to. In such a case, you can enrich your life by “DIY (Do It Yourself)” tools and furniture using things from the island such as branches and stones.

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A "workbench" essential for DIY can be borrowed at the information center. Eventually, you can make your own table!

…

While interacting with the animals, you can enjoy leisurely fishing and catching bugs, or create wildlife, and enjoy the island life freely.

In addition to the introduction of animals and detailed data of all items, how to use the tanuki development special smartphone app, uninhabited island facilities, techniques to enrich life on uninhabited islands, etc. rice field!

It is indeed an interesting game. And this gives some good education to children. But it is quite concerning for children to lose human nature (5 senses), if children live in such virtual space (with just 2 senses) long time. Then I recommend to world mothers and fathers to let children in touch with nature as much as possible.

Going back to How to Win to AI, and How to Keep & Improve Creative Brain for TQM.

—My suggestion is to bring back human nature. Then, I tell the final story which is "**Serendipity**".

3- **Serendipity**.

—Everyone —I call their attention—. You listed up your idea for re-training of thinking. And there is the idea of "reading book" in your ideas. I think it is indeed a good idea. Because you can exert your capacity of "**Serendipity**".

—Serendipity? —I asked figuratively, and I asked them again—. What is this? …This is an unexpected inspiration of luck. This ability is owned by everybody. However, many people put themselves in the condition of not being able to exert it sufficiently. For instance, reading a book is a good means to put yourself in the condition of exerting serendipity. But please mind not do such "Fast reading" or skip in reading. Such fast reading and skip-in reading don't give you the opportunity of **serendipity**.

Serendipity.

Here, I wish to introduce a story to explain Serendipity. This is the dialogue with my friend who reads books many. Many? …How many? …Yes, many and he reads 50 books in a month.

50 books!? Is it possible to do? …Yes, he can. He is an expert in Speed reading (or Rapid reading or Fast reading). One time I made a dialogue with him about drinking.

—What is your purpose to read a book in fast reading? Can you enjoy the book? Can you understand the contents?

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—Purpose? —he asked me surprised—. One is to understand the contents to gain wider knowledge. Another one is to know the book in understanding the synopsis as a topic of conversation.

—Humph… —I questioned—. And do you enjoy it?

—Yes, I should rather think so.

—Fu…mm… —I doubt—. I read a book at normal speed and I can understand the contents. And if the book is interesting, I read it plural times. The book is good, because it tells us about different worlds and experiences. And at each time, I can gain different suggestions or new inspiration. It sounds like you read a literature book. Enjoyable in fast reading? —I asked him finally.

—I can enjoy it, in its own way.

— Mmm? —I hesitated.

Serendipity[10] *is an unplanned fortunate discovery.* ***Serendipity*** *is a common occurrence throughout the history of product invention and scientific discovery. Serendipity is also seen as a potential design principle for online activities that would present a wide array of information and viewpoints, rather than just re-enforcing a user's opinion.*

Wikipedia

By the way, recently, there is a thing which I'm concerned about. This is the "Fast reading" and "Fast movie". I introduced the conversation with my friend who likes to read a book in "Fast reading". Against this, I like to read a book very slowly. Because I can enjoy the book deeply and also can gain something of flush (inspiration, gleam) in the middle of reading.

Against, can he enjoy the book? …No, he cannot. I think the purpose of reading is different. His purpose seems to be to gain knowledge or to know the outline.

I introduce the recent trend of the Japanese Z generation. The concerned point is the same. And I explain by the case of "Fast movie".

According to the Japanese Wikipedia, this is explained as next. By the way, I couldn't find it in English Wikipedia.

A fast movie is a digest video that summarizes a feature-length video work into a video of about 10 minutes and includes a narration so that the story can be understood. Since it is possible to grasp the whole work without watching the whole work, the number of posts has been increasing over the past few years, mainly on

[10] ***Serendipity [eng]***: https://en.wikipedia.org/wiki/Serendipity
Serendipia [esp]: https://es.wikipedia.org/wiki/Serendipia

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user-submitted video-sharing services such as YouTube, in response to generations and consumers who value time performance.

It seems to refer to a viewing style such as watching movies and animations at 1.5 times the speed on flat-rate video viewing services, and watching boring scenes while skipping 10 seconds. No matter how you look at movies and other works, individual freedom is freedom.

They say that I'm busy and don't have time, but I can't keep up with the topic, so I want to see it quickly. I don't want to spend the ***Muda*** time. And above, my friend also told me the same opinion about using the word ***Muda*** time.

However, is it interesting to see a two-hour work in fast-forward or omit version? …Generally, if you watch it normally, you may have encountered a movie of your life, no, a movie that changes your life.

You may think that it is OK if you can follow the story and grasp the essence of the work, but this is very wasteful. Here is a famous proverb that is said to be the words of Mies van der Rohe[11]. Yes, "*God is in the detail. Less is more, More is less*." Even if you can understand the synopsis, "details" such as casual foreshadowing, the subtle atmosphere in the scene, and the momentary acting just with your eyes - are shaken off by the abnormal playback speed and cut off with a fast hatchet. will be lost. However, I think that "movies" exist in such things that are too fast to be seen.

I feel like this goes beyond watching videos. In general, things consist of the essence and superfluous, useless, and tedious details, and "fast" to acquire essence quickly is efficient. I'm a little worried if the feeling that I just need to know the outline leads to such a way of thinking.

Again, what my concern is. They lose the opportunity for self-understanding, deep thinking, and flash.

What is the relation to TQM? …As I write later, I feel that recently quality engineers cannot look at "facts" because of the losing brain flexibility.

And once again, the word "*serendipity*".

It means a sudden stroke of good fortune, but perhaps it is possible to say that the development of science and technology has been achieved through the serendipity of many talented people. Then, what kind of person will have that lucky flash of inspiration? Here, I introduce another word by Pasteur. He said that "luck resides only in the prepared mind".

Prepared mind? …Here, I leave it as the word "Allowance of mind". I believe that you understand the importance of flexible thinking ability, and the training way of it. It ends the description of *Serendipity*.

By the way, still I need to have concerned about the thinking way of the young generation. And the young generation expressed next: "The young generation (you) tells to me that it is a waste (Muda) to spend time to make communication".

[11] Ludwig Mies van der Rohe (March 27, 1886 – August 17, 1969) was a German architect who represented modernist architecture in the 20th century: https://en.wikipedia.org/wiki/Ludwig_Mies_van_der_Rohe

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Muda

Muda, Muda time, etc. My job has brought me in contact with the quality department and its engineers. And recently I feel that they are losing their capacity as a quality engineer. One of the remarkable tendencies is their “cognition bias". I‘ll write later about it.

Probably, their capacity of looking at facts is declining, because of the expansion of convenience tools such as “*Mobileholic”*, Meta, remote work, fast movies & fast reading, etc.

Too exaggerated? …Yes, I think so. But, how can you explain why your quality department capacity is so low? …

Now let’s think about what is **Muda**.

As you know my job as a consultant is to seek the efficiency of the manufacturing factory. And in this case, the definition of ***Muda*** is easy. And the opposite word of ***Muda*** is "efficiency".

Definition of ***Muda*** by Taiichi Ohno.

In Making Stream of Production 0 and 14[12], I wrote the teaching of Taiichi Ohno and the definition of ***Muda***.

Why making the stream of production is important? And, What is the purpose of making flowing production?

Making the stream of production 0-14 in Internet Archive

In TPS, Taiichi Ohno taught us that if there is a (work-in-progress and waiting time) stagnation, the courses of the problem lurk. In another word, stagnation which is inventory and work-in-progress (from the point of view of materials), waiting (from the point of view of the labor) and information causes serious Muda and the flab in the management.

Also, he taught us that “Make the flow of production and lower the water level then it is possible to find more problems”.

The definition of Muda is any non-value-adding activity to the products. Thus, the 7 wastes are Waste of processing, Inventory, Defect and rework, Waiting, Overproduction, Waste movement, and Transportation.

By the way, the young generation says: “Chat or short message by internet is sufficient to convey their intentions”. Chattering with face-to-face and long sentences is a waste of time.

Now so much information is overflowing including Books and Movies. A Movie! …Now Netflix provides so many movies. And they wish to watch these movies as much as possible. And it is a waste of time to watch at normal speed. Reading a Book also is the same. Novels, weekly magazines. There are too much information media. And they wish to know the contents, even though the pieces of knowledge are not deep but very superficial.

[12] **Making the stream of production 0-14:**
https://archive.org/details/makingstreamofproduction13_202001/Making%20stream%20of%20production-1/

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…

> ***Muda*** (waste) time …The definition of Muda is: "*Having no mere effect or utility. Useless. And the situation of useless*".

But now, please leave the "Seeking efficiency of the factory", because there is many ***Muda*** time in our life. And it is quite a natural thing. For instance, daily office jobs such as Commuting time, Waiting, Reading documents, Meeting (together), Coffee breaks, 5Ss in the office, sweeping in the office, etc. You might say that office sweeping is the job of a cleaning person and spending our time on it is Muda.

For example, Meeting (in the meeting room and in together). There are rules and procedures for seeking efficient meeting management. I teach such efficient meeting management.

TQM -2: Introduction 2

Meeting rule of SUMITOMO. (From TPM-2)

1. *Get together before 5 minutes to start.*
2. *Meeting to be scheduled before more than one week (excluding urgent matters).*
3. *Meeting material is to be distributed before more than one day.*
4. *The theme is to be well recognized and shared.*
5. *To speak concisely and clearly.*
6. *Participate in the debate by everyone.*
7. *No distinction between upper and lower positions.*
8. *To keep meeting duration.*

And when I teach such a meeting rule, I add the next item. It is to provide idle time to leave from the meeting theme. Coffee break, Chat, etc. And actually, taking such idle time is very important.

Why? Is it o relevant this idle time? …For inducing "*Serendipity*". For instance, The time of Commuting to the job by train. Get off the crowded train and look up at the blue sky and see the changing green of the trees. Then, people can gain the opportunity of serendipity or bring up the capacity of serendipity.

How about the Muda time (feel as Muda) in our daily life? …Local customs or old conventions, local rules, human relationships, socializing (with neighbors), pride, and other miscellaneous matters. After all, it's better not to waste... it's unnecessary... I don't need waste... I think so.

But is it really so...? …The opposite of waste is efficiency. Efficiently, efficiently, … And always to be efficient is a good thing? …Mhmm…

The essence of things

Our lives have become more convenient...and work has become more efficient thanks to technologies like IoT and ICT. Zoom and remote work are convenient. But I think we are gradually losing important something in the seeking for efficiency and convenience. Thus, the "important something" is an essence of things. The things are

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the 5 senses, *Taste* (***妙味：youmi***), *Appearance* (Atmosphere), *Personality* (Individuality), and *Connection* (Communication). However, the actual use of the 5 Senses (sight, hearing, touch, taste, and smell) is gradually losing.

Taste (Myoumi).

In a dictionary (Japanese to English), Myoumi has explained as just a taste (for example, the taste of some kind of food) in the mouth. And I cannot find a suitable translation of ***Myoumi*** in the English dictionary.

It is explained in the Japanese dictionary as next: It means "skillful taste" and "good point".

The word "*artwork with a **myoumi***" has the meaning of a work with an indescribable taste. For instance, ***Hayasushi*** (***Sushi***) has ***myoumi*** in that the umami[13] of the cooked fish and the rice blend together harmoniously.

In this way, the word "***myoumi***" has the meaning of "skillful taste" and "good point". More easily, ***myoumi*** is Taste (a word with a profound meaning), Interest, the best thing (real charm), Umami, interest, Depth, Rich, Emotion and…

Appearance (Atmosphere)

(Not easy. Japanese is indeed difficult to translate in English.)

Personality (Individuality)

For example. I try to be "me" (express my unique qualities).

Connection (Communication)

Zoom and my Human avatar are indeed convenient and efficient. Thus, the Human avatar is the person of the factory which I'm teaching. He visits the factory instead of me with a web camera and shows me the condition in real-time.

But I'm afraid that we cannot make and keep a real relationship in the condition of which taking coffee together, idle talk, shaking hands & hugging (I personally don't like), drinking, etc.

These are ***Mudas*** in the thought of efficiency. However, these ***Mudas*** are very important for not only keeping the relationship as a human but also for *serendipity*.

[13] **Umami** [eng]: [Taste] That is mild and long, such as that of cured meat, seafood, and fermented foods such as cheese or soy sauce. A category of taste in food (besides sweet, sour, salt, and bitter), corresponding to the flavor of glutamates, especially monosodium glutamate.
https://www.merriam-webster.com/dictionary/umami: being, inducing, or marked by one of the five basic taste sensations that is typically induced by several amino acids and nucleotides (such as glutamate and aspartate) and has a rich or meaty flavor characteristic of cheese, cooked meat, mushrooms, soy, and ripe tomatoes

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I never deny seeking efficiency and convenience. Instead, I believe in the importance of seeking these. However, that is why we should recognize that there is something that is “lost”. And we should understand that there is an opportunity of exerting the capacity of serendipity.

We have different environments and positions. Therefore, each person has an awareness of Muda and an awareness of "what is lost" in our own position and environment. And each of us will make a "compromise" with efficiency in our own environment and position.

Now I'm watching the transition of TQM and human capacity within the transition of ICT, IoT, and AI. And recently, although it was several years ago, because of COVID-19, I felt that the capacity of, for instance, quality engineers capacity became down. More exactly, they are down in their ability to execute against annual quality improvement plan, down of capacity of idea creation, and stereotyped ideas.

They always ask me the concrete ideas for countermeasures. And they don't want to think these by themselves, in spite of no answer in Wikipedia.

The way of my teaching is not teaching the direct answer, but teaching the way of thinking by themselves.

Please understand I'm writing TQM… And please understand it is impossible to introduce or keep or improve quality if the human capacity has been damaged by convenient ICT tools, even though TQM is taught. Also, please understand that I never deny such convenient tools.

And one of the important conditions for my teaching is for the company to have a program for recovering employees' human capacity. If he hasn't, I will recommend you human capacity recovery plan before starting TQM teaching.

As, the final of this ***Muda*** thinking, I would describe the next 3 things.

1. (The Daily) Time Muda is a vitamin of creative thinking.

You can find the essence in ***Muda***. And, ***Muda*** has some characters.

I wrote the ***Muda*** in Making stream of production and introduced the teaching of Taiichi Ohno. And, such ***Mudas*** in the production process is of course useless (waste). However, you saying daily time ***Muda***. Is it really a ***Muda***?

The time of the case of a planned process of something to be done has the case of *Muda* (loss time). But you saying ***Muda*** time in the daily (which excludes the above time) is never useless time or a wasting time. This is your essentially important time.

If I say the conclusion, it is case by case and *Muda* time creates more flush ideas (rather than the time of thinking seriously). You also had the experience of getting the flush of idea

When and in what circumstances? …Everyday moments and chattering, idle time doing nothing, lazily walking with no purpose, etc. And one of my recommendations is lazily walking (for no purpose).

2. Creativity born from doing nothing

This is the story of very long days ago. When I was young, I had a good teacher (my ***Sensei***) whose name is Chuichi Nagasaku. Thus, 3 colleagues and I got a lecture and training on the

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Thinking method in his ***dojo***. The Thinking method has some items which are the KJ method, the Recommendation of *Creative* ***Muda***, and the methods (including ***Meiso*** method: Meditation method).

Below is the introduction to these. And, is there a relation with TQM? …Yes, there is. Because now the surrounding circumstances of TQM which requires creativity capacity are deteriorating.

Is my writing & teaching difficult? …No, not at all.

…

3. **I will write this continuation in the next lecture.** And additionally, I will write "***Cognitive bias***" which is your strong enemy to improve quality.

Now, the surrounding environment of TQM is deteriorating, because of pursuing "Convenience". Pursuing Convenience is never a bad thing. But please don't forget that you are paying some kind of compensation behind it.

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III. Teaching Company[14].

If I say conclusion, I accepted his desire for the consultant contract. I spoke with the Managing Director who visited my hotel and desired my teaching re-contract. After his visit, this Managing Director and Accounting Manager visited me 3 times. This was their tactical victory. Because they visited me a total of 3 times for the negotiation. And second and third times were both of them.

Their tactical victory? …They studied and knew my habit of taking whisky after dinner for relaxing at the almost same time. And it may be had been a hint given by the Accounting Manager that I become generously with taking alcohol. I thought "Well, there is nothing that can be done"…

Factory Management Checklist EXCEL-File in internet Archive

However, before my visit, I gave the task of self-factory diagnosis by the Factory Management checklist[15], Employee Motivation checklist (now changed to Employee Engagement Checklist), and, 5Ss checklist to this factory. The results were the sheets attached next.

Factory Management Checklist[16] result:

Theme	Check Items	Points	%
1.Policy Control	8	19	47.5
2. Organization and administration	9	22	48.9
3. Human resources development	10	25	50
4. Information gather & transmition, usage	8	23	57.5
5. Standardization	10	28	56
6. Cost control system	13	30	46.2
7. Factory Management system	11	32	58.2
8. Production control	10	27	54
9. Material control	12	29	48.3
10. Quality control system	13	28	43.1
11. 11. Safety control, Work environment, Environmental Conservation	6	15	50
	110	278/550	50.5

[14] **Teaching company** is a series of a real story about the implementation of TPM and TQM in a medium sized company by ***Sensei*** Kimura. They are deployed throughout TPM-7 to TPM-16 and It continues within this TQM series. The beginning of these series is in TPM-7:

- TPM-7 page 31 One Lecture in a Company [English]: https://archive.org/details/TPM7SeisoInJishuHozen/page/n29/mode/2up?view=theater
  Previous lecture in TQM-2: https://archive.org/details/tqm-2-introduction-2-cost-reduction-5
- TPM-7 page 31 Una conferencia en la Empresa [Spanish]: https://archive.org/details/TPM7SeisoEnJishuHozen/page/n29/mode/2up?view=theater
  Lectura previa en TQM-2:

[15] **Factory Management Checklist in Internet Archive (EXCEL File):** https://archive.org/details/factorymanagementchecklistespeng_202001

[16] [eng] Factory Management Checklist in The Factory Management Encyclopedia Volume I: The System of Excellence: https://www.amazon.com/dp/B08RW89DMW

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Employee Engagement Checklist[17]

Factory Name; XXXXX	Date;	XXXX	By; Staff & Manager Team
Categories	Points	Rate(%)	Comment
1) Condition of good employee engagement. (1) ~ (32)	74	47.4	3
2) Corporate vision. (32)	2	40	0
3) Psychological safety. (33) ~ (42)	23	46	2
4) Education for managers. (43) ~ (55)	34	52.3	1
5) Organization how should be. (56) ~ (66)	23	41.8	2
6) Education & training for employee. (67) ~ (71)	13	52	1
7) Dialogue. (72) ~ (78)	11	31.4	3
8) Transmission of information. (79) ~ (84)	15	50	0
Total	195	46.4	12
	84x5	420	

5Ss Checklist[18]

75%, Good enough, but omit more details.

Please look at the check results in the attached checklists and links.

For the first time in 7 months, I visited this Teaching Company. And I was greeted by the Managing Director and the Accounting Manager, and they led me to the conference room. I was greeted by all Management team managers. It was indeed an enthusiastic welcome. And honestly, the attitude of some managers was very much aloof.

Then, I visited and looked around the factory carefully as usual with the Managing Director, the Accountant Manager, and the Production Manager after the greetings. I was relieved because the ***Kata*** which I taught was maintained, with the exceptions of the backyard and the toilet.

The step of the factory management style of this company was still the step of "***Shu***". Therefore, it was a good level. Indeed at the time, I thought so.

However, it is a good level? …The result of their self-check of Factory Management Checklist was 50.5%. And still, would you say good level? …Yes,

5S Checklist Koichi Kimura non edited Google Drive file

TPM-10 Employee egagement + Oil Control

[esp] Lista de chequeo de gestión de fábrica en la enciclopedia de gestón de fábrica, volumen I. **El sistema de la excelencia**: https://www.amazon.com/dp/B08RSBJMLK

[17] **Employee engagement checklist in TPM-10:** https://archive.org/details/tpm10employeeengagementoilcontrol/mode/1up

[18] **5S Checklist non-edited checklist**: https://docs.google.com/spreadsheets/d/1rD1xDtMhUilgWZx8fMSzt7DRtqgyh7cN/edit?usp=share_link&ouid=112171565690803127094&rtpof=true&sd=true

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I do. Please understand that there are stages of bringing up. There are the steps of ***Shu***, ***Ha*** and ***Ri***[19]. But a factory needs to gain experience and acquire skills in "***Shu***" stage.

Maintaining introduced ***Kata*** requires the skill to use the ***Kata*** sufficiently. This factory already introduced the ***Kata*** of Management Team and regular meetings, Policy Control procedure and annual action plan, Factory management indexes, Gemba Committee & 5Ss & Safety, QC Circle & Small group activity, etc. However, the implementation and effects were, of course, insufficient. Particularly the Policy Control Story: From Strategy to Annual Policy & Annual Action Plan & Monthly Review Meeting. It wasn't implemented yet.

1. Lecture to the management team after our visit to the *Gemba*

Now I describe the lecture to the Managing Director and the Management team after the ***Gemba*** walk.

Actually, it became and happened a very hard debate. And I made a very strict comment. Yes, I changed my attitude against them. And I was thinking to lose this new job, but it is something I accept as a risk.

—Everyone —I call their attention—, thank you for your hard work on the factory management diagnosis. So, according to your self-check-in on the Factory Management Checklist, the score was 50.5% in all. I personally appreciate the point that we can now make the conversation on the same playing field at last.

—Thank you for your word, ***Sensei*** —The Managing Director expressed—. But my concern is that still, 5 items are still less than 50%.

—Please keep cool Managing Director —I tried to him calm down—. It is still 7 months after starting the managerial innovation. —I willingly used the word “managerial innovation”—. And now it is necessary three actions. The first one is, of course, to maintain the ***Kata*** which you have started, by avoiding straying from the road. The second one is advanced preparation, throughout whole people participation.

—Advanced preparation? —The Managing Director questioned—. What does it mean?

—I believe you are providing the new strategy and policy up to the next financial year because your middle-term strategy hadn't consistent with your actual activity. I understand that surrounding

[19] ***Shu***, ***Ha***, and ***Ri*** (守、破、離):

- ***Shu*** (守): ***Shu*** means to keep. Keeping ***Kata***, which is taught by the teacher. Anyway, it is required to master the ***Kata*** which is like a Judo form. This step is still training level.
- ***Ha*** (破): ***Ha*** means to break. After keeping ***Kata*** taught, the next step is to analyze and study by himself and create better Kata.
- ***Ri*** (離): ***Ri*** means to leave. To understand the teacher's ***Kata*** and his own. ***Kata*** deeply. And, free from the teacher's ***Kata*** and his own ***Kata*** and break new ground including the philosophy.

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business circumstances are changing rapidly. Therefore, it is necessary to revise middle term strategy annually. However, it's only a problem if you don't have consistency.

—For instance —I detailed—, the TPM project. So, the TPM introduction with the project was a sudden policy change and with a just idea of top management, and there were the **missing processes**…

—Indeed, success or unsuccessful is by preparation. Or in other words: "Sufficient preparation promises your success". And even in other words: "it will be possible to say that 60% of the process is the preparation". The **missing processes**: Investigation of method and study against the final goal, which is Profit recovery.

—In the Factory Management Checklist there is a point named **"(3) Validity & Consistency of the policy**"… And now we are facing an era in which the business world has turned to "management based on the assumption that the future is unpredictable". Thus some kind of philosophy is required. In this era, the "theme" is considered important. Indeed, any era is deployed in the same way, but the speed is tremendously different now —and I continued.

Factory Management Institute COOPERATING TO REACH EXCELLENCE	1 - DEPLOY & POLICY CONTROL		
No	FIELD	CHEKING POINTS	**0** (Naught) → **5** (Perfect)
1	There is an Annual Management Policy	On the following aspects: Security, Quality, Dispatch, Cost, Environment and Development (SCDCED)	**3**
2	Their Method and Agenda to decide the Policy	Agenda during the year, Participation of all departments, including in the design of the KPIs:	**3**
3	Validity and consistency of the Policy	Business motto, Strategy, Long-term plan, Condition Current, Oriented towards the future	**2**
4	Degree of Transmission and Policy Penetration	Company and Website Bulletin, Visual Tracking Board (SQDCED), Logo and Motto or Slogan referring to the annual policy	**2**
5	Policy Materialization	Is there departmental policy, KPI and Annual Action Plan, up to the level of the group and the people?	**2**
6	Annual Action Plan Check and Evaluation	Is there monitoring and measurement of the effect, on SQDCED and 3S, in addition to the Moral, and the shared sense of values?	**2**
7	Current Status and Concretion	Are Statistical Studies and Study of Deviations and Trends on Indexes Performed?	**3**
8	Core Competencies and Measures	Is there an Understanding of strengths / weaknesses, Indices, Measures and Is there coherence with the long-term plan on Vision + Strategy?	**2**
TOTAL			19
% = score of the 6 questions / 40 maximum score			4%

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—Next important thing is the *narrative ness* which is from corporate philosophy to long-term & middle-term strategies and annual policy.

Narrative ness

At a conference, I spoke about novels and policy control.

What is an excellent novel? …and suddenly, I thought about such a principle. It is possible to change the question of what you want to make up a story.

According to my friend, there are 5 elements to making novels. It is said that it is "Sentence, Theme, Narrative, Person modeling, and the Same era characteristic".

The sentence will create a novel quality foundation. Until a while ago, person modeling was extremely emphasized. There is no room for discussion that narrative is attracting readers.

Under such circumstances, a friend, who likes the discussion, states that the "theme" may be the most important. The business community has turned on the "management that is unable to read" and faces the era when philosophy is required. In exploring themes, a wide range of knowledge and deep consideration other than literature will be one of the elements that produce results. I was convinced that if I stayed only with expressive power and personal sensitivity, although this was also important, I could not write a very attractive novel. It was a compelling proposal to capture this complex reality.

A novel is necessary to charm the readers. The story of policy control, from corporate philosophy, and long & middle term strategy to annual policy & annual action plan, has similar points which are. Getting understanding and sympathy from employees.

As you know, there are 6 essential Management Resources which are: People, goods, assets, information, time, and intellectual property.

People think about what are we making and why. To earn daily food. Yes, it is still correct. However, it is not all. Human is the animal who has philosophical thinking, not able to stop thinking.

Please don't neglect the policy story.

—I said that your Policy Control has no consistency —I pointed this out to the group of managers—. As the middle-term strategy, it is acceptable to have the item of "Profit Recovery". However, nobody could understand the relationship between Profit Recovery and the sudden project of JIPM's TPM. Probably, nobody understood.

It was indeed there was no story flow of policy control. I call such management a "haphazard way of management".

—I understand that profit recovery is important. However —I questioned—, I doubted that the goal of essence is not mere "profit recovery", but is the company's healthy growth, isn't it —I guessed—. And this "profit recovery" of the middle-term strategy should be a mere one item between all the necessary items for the company's healthy growth.

—Why I convinced as it (haphazard management)? …

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- The production capacity, or the employees and equipment, is kept for future recovery.
- On the other hand, the Managing Director declared ROA (Return On Assets) introduction as an additional factory management index.
- Sudden TPM introduction declaration. And,
- The policy of “Prohibition of receiving the order in red”. This policy had no strategy for analysis of the current market situation including consideration of core competence.

—Now point number four of the factory management checklist is about policy control and deployment (**4 - Degree of transmission and Penetration of the Policy and Policy statement**) —but from around this time, my feeling became stringent.

—Mr. Managing Director, please let me know. There is a logo or slogan of "Our company's policy" in reception and working ***Gemba***. And, it is said, "We focus on quality supplier and health & safety working environment".

—I think still you don't understand the difference between corporate philosophy and policy: "We focus on quality supplier and health & safety working environment"—I named, and detailed my opinion—. It is a good word and nobody denies it. However —and I repeated—, however, it is not the policy and looks like corporate philosophy. But it is quite clear it is not your corporate philosophy which you have shown before. Indeed, it is not a policy statement and also not your corporate philosophy —and I finally asked the Managing Director—. Mr. Managing Director What is this?

The Managing director tried to explain to me. However, I prefer not to describe here his detailed speech.

—I don't want to fail my teaching —I questioned him—. If you like to keep the item of "Profit recovery" in your middle-term strategy, I need to obey your decision. But you need to consider how can you explain to your employees —and I detailed more deeply—. You asked my teaching new theme to be TQM. Please make it clear. What is or is there the relation between TQM activity and your middle-term strategy "Profit recovery"? —I asked figuratively because I didn't expect a detailed answer, or even an answer.

—Is this requirement merely your "haphazard management" again? —I asked him and I explain detailed—. In Toyota's 7 wastes (7 ***Mudas***; Excess production, Waiting, Carriage, Work contents itself, Stock & inventory, Movement, Defects), there is the item of "Quality defect". Therefore, it is true that TQM contributes to eliminating ***Muda***. And we know that there are quality problems in your ***Production-Gemba***. However, how about the contribution of quality improvement in TQM activity to the "Profit recovery" target?

—What is your action plan for this target? ...I suppose that the quality improvement activity is also included in the plan as usual. —I asked finally—. Mr. Managing Director… What is your scenario for your middle-term strategy "Profit recovery"? I cannot see the road map to it. Anyway, I don't want to fail, if teaching. The policy story is a road map, and it must be shared by all.

—Also, now we need to talk about point number 5 in the factory management checklist regarding the policy deployment (**5 - Materialization of the policy**)

—Mr. Managing Director —I questioned him again—. I'm expecting your annual action plan. I believe you are making the annual action plan based on the middle-term strategy and also according to the policy control story. Thus, You established already the organizational ***Kata*** (which I call hardware of management) such Management Team and monthly performance review meeting system, KPIs and data gathering system, and ***Gemba-Committees***. Now you need to enhance the software side and draw out the individual capacity —I was thinking so.

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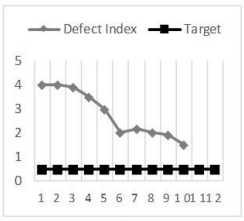
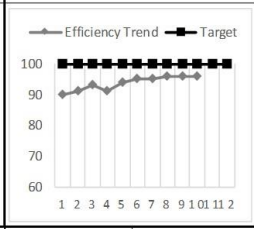
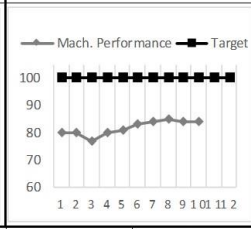
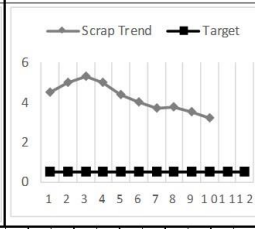
—"Materialization of policy". How? — I asked figuratively because I didn't expect any answer—. I already taught the form of an action plan (the next page figure). As you can see, the essences of the action plan are. Of course, concrete action items, prospects, dates, responsibilities, and follow-up schedules.

Company Policy	TARGET TRACING ACTION PLAN SHEET			Factory Management Institute		Date: October 2017	
	Department:					Version:	
	Quality Trend		Efficiency Trend		Machinery Performance		Scrap Trend
	Defect Index						
Department Policy							

Theme	Act	In Charge	Content	Estimate	Current	Target	Action Progress	1	2	3	4	5	6	7	8	9	10	11	12
Defect	1				4,5%	0,5%													
Index	2																		
	3																		
Quality	4																		
Improvement	5																		
			TOTAL																
Efficiency	1				96,0%	100,0%													
Improvement	2																		
			TOTAL																
Machinery	1				84,0%	100,0%													
Performamce	2																		
	3																		
	4																		
			TOTAL																
Scrap	1				3,2%	0,5%													
Decreasing	2																		
	3																		
			TOTAL																

— One of the bad points in your current action plan is nobody taking responsibility. And, Nobody taking responsibility is the meaning of disturbing the growth of individuals. Please, understand Mr. Managing Director —I insisted—. A company is the aggregation of individuals. And I tell you that **Ultimately, the growth of a company is the sum total of the growth of various "individuals**."…

—Now this meeting is just management team members. Then I tell you that your most important task is to stop trying to manage your people and support the motivations and success that each person has. In this way, the most important task of a manager is to let your subordinates succeed —I pointed out—. The action plan is a result sheet of not only your subordinates but also yours.

—Later, we will review the result of the Employee Engagement Check result. It is becoming better but is showing the causes of leaving employees still. Now we need to consider point 6 (**6 - Check & Evaluation of the annual action plan**)…

—This item is for evaluating the degree of these Quality, Cost, CS, Delivery, Profit, Safety, Environment, Working environment, Morals, and Share of sense of values. But, Why is this item in Policy Control? ….The purpose of this check item is to see the completion degree of the annual action plan —and I continued...

—I teach management ***Kata*** (form) first. And it is your task to enhance based on the ***Kata***. You spent 7 months after my teaching, but still 7 months. Therefore, the poor score is acceptable to me.

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However, I'm expecting your new annual action plan for the coming financial year. And these items must be in a new annual action plan.

—I believe that there are company-wide annual plans, departmental annual plans, and sectional annual plans. And above example sheet is for the departmental action plan.

In my previous company, the essential factors of the annual action plan are QCDDM; Quality, Cost, Delivery, Development, and Management.

— Yes —the Managing Director intervened—, we are now making annual policy based on the middle-term strategy and current internal and external conditions. For doing it, headquarter required us to add an additional index which is ROC. Everyone needs to follow this index.

—Everyone —I pointed out clearly for the attention of all the managers while they were looking confused.

—We have already got this announcement from you —expressed the Engineering Manager—. However, I personally cannot understand how can I do it so far.

Then, all managers looked at me. And I whispered in my heart "I don't care!". But unable to stand by any longer, the Accounting Manager opened his mouth —I already explained what is ROC. Therefore, you need to consider it as your department individually —told them the Accounting Manager while the managers said their many apologies for not having done it.

—Everyone —I said a little bit annoyed—, I suggest you next 2 things: The first one is ROC index is a corporate (company-wide) target. Therefore, it is necessary to break down your action items. And secondly, you already have the indexes to improve ROC. But it is true that still, the performance is poor.

— Are we doing? —said suddenly the Production Planning manager.

—Yes —I questioned—, you are. And the formula and the meaning is as next. (From TQM-2)

It was ROC (Return on Capital)

$$Return\ on\ Capital\ = \frac{(26) Net\ Profit}{Total\ Capital}$$

$$= \frac{(26)\ Net\ Ptofit}{(1)\ Sales\ ammount}\ x\ \frac{(1)\ Sales\ ammount}{Total\ Capital}$$

$$= Sales\ Profit\ Rate\ x\ Total\ Capital\ Turnover$$

TQM -2: Introduction 2

Return on capital (ROC), or return on invested capital (ROIC), is a ratio used in finance, valuation, and accounting, as a measure of the profitability and value-creating potential of companies relative to the amount of capital invested by shareholders and other debtholders. It indicates how effective a company is at turning capital into profits. And, the ratio is calculated by dividing the after-tax operating income (NOPAT) by the average book value of the invested capital (IC).

By SNS

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—Probably —pointed out the Production Planning manager—, we got the lecture about it. But we don't understand still. Please let us know what are we doing for ROC improvement.

—Once again, please understand the formula of ROC —I detailed—. There are 2 ways to contribute to ROC. It is simple. Indeed very simple: **Improve profits** and **Reduce assets**…

—To improve the ROC index, it is necessary to improve profit or to reduce capital. You are doing or trying both. Thus, to increase sales profit, you are making an annual action plan for internal Muda reduction. I haven't looked at it, but I believe you are preparing it in the annual action plan. Aren't you? —I asked him, and he nodded slightly.

—Externally —I described it deeply—, there is the one stupid policy which is "Prohibition of receiving the order in red" already. But this stupid policy will not go a success, because of no possibility of being sold.

—Another is to reduce the assets —I continued—. Now you have many excess assets excess equipment and dead stock, excess inventory —and I began to describe these two points.

—**Excess equipment**, firstly. I know your policy which is to keep excess machines and production equipment for future growth. But for example, why do you need 4 forklifts? It is possible to reduce 1 immediately, even though expecting future growth.

—What is your future production prospect, strategy, and tactics? —and I answered to myself—. And based on this future production prospect, it is necessary to plan the necessary production equipment capacity and the necessary manpower planning —and I insisted—. I said it is a prospect. In my previous company, we never say "Prospect", but Process sheet, which must be achieved…

—Secondly, we can consider the **Inventory**. At long last, you classified the inventory as dead stock, excess, and normal stock in colored identification. You need to treat the dead stocks and excess inventory. And you need to reduce the normal material inventory more…

—Did you finish the standardization of dead stock, excess, and normal inventory classification? — I asked them finally.

—No, not yet —said with bitter face the production manager, in charge also of Material Management.

—I have introduced the definition of dead (obsolescence) stock, excess and normal inventory. As next (From Making Stream of Production-11[20]):

- Inventory separation with color (Normal, Obsolescence, Excess).
- Obsolescence (stock): Already design changed or the business to be no expected. And the location area is separated and identified with red color.

Making the stream of production 1-14 in Internet Archive

[20] **Making the stream of production 0-14:**
https://archive.org/details/makingstreamofproduction13_202001/Making%20stream%20of%20production-1/
Estableciendo la corriente de producción 0-14:
https://archive.org/details/establecerlacorrientedeproduccion13_202001/Establecer%20la%20corriente%20de%20producci%C3%B3n%200.%20El%20camino%20de%20TPS.%20Introducci%C3%B3n/

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- Excess of inventory: more than double months against the purchasing LT (Lead Time). The location area is identified with a yellow color.

—You don't need to my standard —I pointed out—. But it is quite important to have an inventory standard against obsolescence, excess and normal stock…

—By the way, I appreciate you separated the inventories by color identification. But why don't you process the obsolete inventory? —and I answered to myself—. I saw a red tag which is already discolored and confirmed the confirmation date.

—Is stock (inventory) the assets? …Once again, we confirm the definition of assets.

—An asset is defined as the utility potential attributed to a company's economic entity. However, not everything that has the potential to generate profits is an asset, and only those that have a high certainty of generating a profit that can be evaluated in monetary terms are defined as assets.

—Mr. Production Manager —I asked him—, is "No treatment of the obsolescence inventories which are finished goods, work-in-progress and raw materials included" your hobby? —and I answer myself with another question—. Why are you counting such clear obsolescence (dead) inventory as assets? …And are you considering the worsening of the evaluation of the profit and loss statement caused by appraisal profit and loss, are you?

The Production Manager looked surprised by my change.

—Mr. Accounting Manager, is your new additional policy improvement of ROC, is it? …One efficient idea is quite simple and is the reduction of the asset. Am I right? —and I continued—. Your company is a little crazy. Because making excess products by excess production capacity and stocking these by unnecessary control cost and necessary to dispose of.

—ROC improvement? …Ridiculous! —and I said to the Production Manager— Do you understand what is the most effective means to improve ROC as a factory? …Of course, you understand it —answering to myself without waiting for any kind of answer or question—. It is to reduce internal ***Muda*** by eliminating excess production capacity (labor and machines and equipment).

—According to a manager, still you are dreaming to be able to increase receiving the order. But a fact of 7 months tells us the reality of gradually declining receiving orders. Stop excess production Mr.Production Manager —I expressed just a little bit of anger.

—Treatment of (excess) employees? …—I asked him, however, also thinking it was not my matter—. It is quite clear that your company is going to bankrupt. And the worst case is the stupid policy of "Prohibition of receiving the order in red".

—Procuring ***Muda*** and excess materials, excess production obsoleses stock, etc. It is my surprise how dear you can maintain the cash flow —I expressed a little bit disappointed.

—But, back to the topic —I pointed out—. I believe you are doing the ROC improvement activity in management ***Kata***. Again:

$$(ROC)\ Return\ on\ Capital\ = \frac{(26)\ Net\ Profit}{Total\ Capital}$$

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$$= \frac{(26)Net\ profit}{!1)\ Sales\ Ammount}\ x\ \frac{(1)\ Sales\ ammount}{Total\ Capital}$$

$= Sales\ Profit\ Rate\ x\ Total\ Capital\ Turnover$

And,

- Improve profits.
- Reduce assets.

Making the stream of production 1-14 in Internet Archive

—Mr. Production Manager —I called his attention again—. You are in charge of warehouse and inventory control also, you are? —and without hesitation, I answered to myself—. I taught you the method of "cycle counting system" to confirm matching between computer records and real inventory. And the previous result was 71%. But is the result of 4 months before. What is the average for last month? —again I answered to myself—. Is 71% never sufficient for inventory control, isn't it? —and I questioned finally—. Why did you stop? —In my heart I felt he stopped the fundamental ***kata***, Why did you stop basic ***Kata***!?

—Mr. Managing Director —I pointed to him kindly- I'd need to remind the fundamental index in the TQM deployment: The Cycle Counting.

Cycle counting *(From Making stream production-11[21])*

Daily (or weekly) inventory. And, each day 10 items of inventory are checked and compare the results to the computer registration to monitor the accuracy. I recommend implementing daily (at least weekly) inventory checks. And, of course, once or twice a year inventory checks should be implemented.

This cycle counting is one of the quality control ikey indicators.

Inventory control in computers to be good accuracy is a superstition because the operation is owed by the human being.

$$Accuracy\ rate\ (defect\ ratio)\ =\ \frac{1 - Number\ of\ mismatch\ cases}{100}\ x\ 100$$

$Daily\ (or\ weekly)\ accuracy\ rate\ \boldsymbol{Control\ Graph}.$

If the trend of the accuracy rate percentage is less than 95%, something of special activity should be implemented.

[21] **Making the stream of production 0-14:**
https://archive.org/details/makingstreamofproduction13_202001/Making%20stream%20of%20production-1/
Estableciendo la corriente de producción 0-14:
https://archive.org/details/establecerlacorrientedeproduccion13_202001/Establecer%20la%20corriente%20de%20producci%C3%B3n%200.%20El%20camino%20de%20TPS.%20Introducci%C3%B3n/

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—Mr. Production Manager, Do you remember we introduced the index of Inventory Turnover? —and I continued—. The new consultancy contract is TQC, is it? —and when he nodded slightly I continued—. "Total" of TQC is the meaning of "All people's and organization's participation". When deploying it, not only the ***Production Gemba*** but also the ***Office Gemba*** should be involved…

—Of course, warehouse and inventory control are never expected. The function of inventory control is to supply materials to production Gemba and should have the responsibility of JIT supply (Necessary materials & Necessary quantity at Necessary timing)…

—On the other hand, it is never accepted to have excess inventories, work-in-progress because of keeping JIT to your ***Production-Gemba***. And because of seeking better delivery to the customer, it is also never acceptable to have excess finished goods inventory.

—Mr. Production Manager, You are lucky. Perhaps, your company's cash flow is abundant, despite such conditions (obsolescence, excess inventories). —I told him with irony. Actually, the cash flow was becoming worse.

—Now you are required by headquarters to improve ROC. Simple —I said, but now without irony—. It is very simple. It is ordering you to eliminate internal ***Muda*** by labor & machine efficiency and also by improving inventory turnover. And we understand the situation about the mismatch of production capacity and receiving the order and the causes, particularly the stupid policy…

—But very bad inventory turnover is completely your responsibility —I pointed out and questioned finally—. How is the situation of inventory turnover of last month?

—Mr. Accounting Manager, —The Production Manager asked him—. What was the result of it?

—I don't know the monthly Inventory Turnover ratio, but calculating the half financial term result —The Accounting Manager answered him.

Inventory Turnover ratio (From Making stream of production-12[22])

*For the evaluation of cash flow in **Gemba**, we decide to see the inventory turnover of each factory and the entire.*

$$Inventory\ Turnover\ = \frac{Sales\ amount}{Actual\ inventory}$$

***Actual inventory**: Raw material, WIP, and Finished goods.*

—And I think that we decided to calculate the monthly Inventory Turnover as one of the key factory management indexes, didn't we? —the Accounting Manager expressed deeply— Incidentally, the Inventory Turnover ratio of the last financial term was 2.3 turns.

[22] **Making the stream of production 1-14:**
https://archive.org/details/makingstreamofproduction13_202001/Making%20stream%20of%20production-1/

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—Mr. Managing Director —I asked him—. I taught the Factory Management ***Kata***, did I? …And you know that monthly Inventory Turnover is a key index to control inventory and improvement of cash flow, don't you? —and I continued without waiting for an answer— ROC improvement!? Ridiculous. No, it is not ridiculous, but seriously important. However, why don't you take action against it?

—Kimura —The Production Manager pointed this out to me—. We are doing it, are we? As Mr. Accounting Manager told you before, even though each half financial term, we are using this figure.

—Very good —I said with irony to the Production Manager—. And I believe that you are involving this matter in your annual action plan, are you? …And what is your idea to improve Inventory Turnover? I believe you understand the relationship between ROC improvement and Inventory Turnover, you are. For improving ROC, it is essential to reduce assets, above all reduction of inventory.

—Mr. Production Manager —I called his attention—. The factory management including inventory control is your responsibility. How is your management cycle? ...Is the cycle each half financial term?

The meaning of Inventory Turnover of accounting

The "turnover" of the Inventory Turnover ratio means how many times the company's inventory is turned over in a year to sell products and whether raw materials and work-in-progress are taken out and used them.

For example, if the inventory turnover rate is 2.3 times, it means that the inventory is turned over in one year and that the goods and products are used or sold once in about 159 days (365 days ÷ 2.3). (Completely constipated condition management)

But this accounting data is called a death certificate by me.

As you understand, yearly cycle or half-year cycle data cannot be used for factory management which requires daily control, weekly or at least monthly control.

—Mr. Production Manager —I finally told him—. Now it is quite clear that you cannot manage the ROC issue and Inventory turnover. Half-year cycle Inventory Turnover calculation!? …Ridiculous. Why did you stop the daily cycle counting system and monthly Inventory Turnover calculation by computer calculation? …And, How can you do for the top policy of ROC improvement?

—At present, you can do nothing about it —I continued talking to the Production Manager—. You need to do the daily, weekly, and monthly level factory management. Because the matching ratio of the last time (4 months before) between the computer record and actual by-cycle counting is too bad (71%). Therefore, you cannot grasp the accurate inventory monthly. It is the meaning of that it is not possible to use the computer figure for Inventory Turnover calculation.

—Mr. Managing Director—. Please abandon the target of ROC. Or do you break down the ROC to action items of each department, particularly the PD's department? …you have much obsolescence finished goods, work-in-progress, and materials, have you? These obsolescence inventories are not assets, but you keep these as assets. And, the obsolescence stock is never the assets and should be proceeded.

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—You required me to introduce TQM in this company —I pointed out—. But please understand that TQM is not for just ***Production-Gemba*** and is applied for ***Office-Gemba*** and system quality. So, TQM is necessary to investigate the causes like as a quality defect or customer's claim to prevent the re-occurrence. It is the same.

—The "T" of TQM —I described it more deeply—, means all people's participation and all organization's participation. And the meaning of participation of (***Office Gemba*** and) the organization is not only to support ***Production Gemba*** but also to pursue the quality improvement of the organization itself.

—Kimura —Hesitatingly intervened the Production Manager—. Why do I need to be criticized by you? —He asked just a little bit annoyed and he asked then— Action plan!? …Yes, I made it, and look at its result. And I almost achieved the plan (of the previous financial term). Now I'm making for the next financial term. Why do you criticize me? …And the result is shown in the monthly P/L Statement.

—Mr. Production Manager —I pointed him out—. You are a Director. Therefore, you know well why we make management, you do. Making action plan, almost completing it, but bankrupt. Yes —I insisted—. Your company is bankrupting, because of the lack of cash flow and the red financial result.

Achieving target!? …You are a director. You must speak as a Director. Of course, you have the face of a production department manager.

—It is quite true that last month's P/L Statement shows good labor efficiency and reduction of quality losses —said the Engineering Manager—. What is the problem? …

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IV. Cost Control [23] – 6

I will write combining Cost Control-6 with this company's case. Even the next figures are fictitious numbers.

Let's look at this company's monthly management reports which are constituted of P/L statements, Labor efficiency, machine performance indexes, quality reports, etc. The comment of the Engineering Manager was based on the Labor and machine indexes and quality report. And, in fact, these indexes were kept well. However, it is never sufficient to diagnose a company.

Next is this company's P/L Statement, which is used the Total Costing. It is indeed, Total Costing is used for the settlement account for the term. And I taught them to implement the monthly management meeting by using a monthly settlement account. But it is not suitable, but not sufficient. The Manufacturing Cost Report wasn't shown in this important monthly management meeting, but just P/L Statement.

If using Total Costing, Manufacturing Cost Report is essential to identify the movement of materials, work-in-progress, and products (finished goods) and the composition of manufacturing cost.

I hadn't seen a case of such Total Costing for using monthly review. Well, it must be acceptable. And I guess I just didn't have the experience. I taught my style P/L Statement and Inventory Turnover but weren't used.

P/L in Total Costing				Month: xxx1	
			Manufacturing Cost Report		
	Direct Material cost				
		1	Beginning of term inventory material	2,100	
		2	Current material purchases	17,500	
		3	End of term inventory material	**-3,250**	
		4	Total	16,350	*1+2-3*
	Direct Labor cost				
		5	Direct Labor cost	8,500	
	Indirect Manufacturing cost				
		6	Indirect material cost	375	
		7	Indirect Labor cost	1,550	
		8	Expense	3,400	
		9	Total	5,325	*6+7+8*
10	Current Total manufacturing cost			30,175	*4+5+9*
11	Beginning of term work in progress cost			103,050	*unsold*
12	End of term work-in-progress cost			**-104,750**	*unsold*
13	Current products manufacturing cost			28,475	*10+11-12*
P/L Statement				Month: xxxx1	
14	Sales ammount			38,250	
15	Cost of Sales				
		16	Beginning of term products inventory	103,050	
		17	Current products manufacturing cost	28,475	*10+11-12*
		18	End of term closing inventory products	**-104,750**	*unsold*
		19	Total	26,775	*16+17-18*
20	Gross profit			11,475	*14-19*
21	General and administrative expenses & selling cost			7600	
22	Operating income			**3,875**	*20-21*

[23] **Cost reduction** is a series of lectures about the interpretation of different cost regarding to calculate the Profit and Loss statement adequately depending on the activity and policy of the company:
Cost Reduction – 5: [eng] https://archive.org/details/tqm-2-introduction-2-cost-reduction-5
Cost Reduction – 4: [eng] https://archive.org/details/tpm-16-oil-control-5/page/8/mode/2up
Cost Reduction – 3: [eng] https://archive.org/details/tpm-15-cost-reduction-3-and-consultancy-job-contnuation
Cost Reduction – 2: [eng] https://archive.org/details/tpm-14-clasification-of-cost-and-oiling
Cost Reduction – 1: [eng] https://archive.org/details/tpm-13-oil-control-3/mode/2up

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1. Direct Material, Direct Labor, and Indirect Cost

Please refer below chart (from TQM-1[24])

Cost Classification		**Material**	**Labour**	**Expense**
		Cost of goods consumed to manufacture the product	Personel cost for employees involved in manufacturing such as direct work, indirect work, and back office.	Cost of Outside of Material & Labour
Direct	Clearly recognized ammount consumed for particular product.	Raw material and Purchased parts	Consumption wages for direct working hours in which direct workers to be involved in the manufacturing	Outsourcing Air, Gas, Water, Utility, Electricity.
Indirect	Unclear consumption for each product	Auxiliary material cost: Paints, dyes, fuel cost for manufacturing machinery, Factory consumable cost, the consumable cost in the production process, machine oil, consumable tools & fixtures, spare parts that are outside of fixed assets.	All other than the above are classified as indirect labour costs: Welfare, Bonus, Allowance, Provision for retirement benefits, etc. Wages for supervisors, line leaders, inspectors, material handlers, shipping or receiving clerks, maintenance technician.	Welfare facility, Rental, Insurance, Depreciation, Patent.

I believe you can understand the abnormality of some figures. Thus, the abnormal figures are 11, 12 (work-in-progress), 16, and 18 (products; finished goods).

TQM-1 Prologue and What is Quality Control

Why so much inventory of work-in-progress? …This Teaching Company has 2 factories. And Factory-1 produces the machining process and sub-assembly process. And Factory-2 is the final assembly and shipping. And the material warehouse is a separate building.

These 3 areas are working independently. At least, and if using the ***Kanban*** system between Factory-1 and 2, there are no troubles, even though separated and independently (like Toyota). But it is bad production control.

The inventory of a month's work-in-progress (End of term work-in-progress) was 104,750 (12). And some of them were already obsolescence (red tags) and will be put yellow tags after 3 months and then become red tags.

Manufacturing Cost Report shows the movement of money which shows how money was used. And 13 was the result of the Production Cost for this month, which is 28,475. Thus, the P/L Statement shows the result of the money movement.

[24] TQM-1: https://archive.org/details/tqm-1-prologue-and-what-is-tqm

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What problem is there? …These results made very bad cash flow. They are letting cash freeze. If a normal company, this company goes bankrupt. And this item was shown clearly in the Balance Sheet.

Fortunately, this company could borrow cash from its headquarter. But the headquarter couldn't stand its situation and required a new target which was ROC improvement. Thus, as the middle-term strategy, it couldn't reduce production capacity in labor & equipment. Then, and biggest obstacle against the cash flow and ROC which is Inventory was demanded to reduce.

Now let's look at the inventory by the Inventory Turnover.

2. Inventory, and Inventory Turnover

I told you this factory that you are already implementing the ROC improvement. The obstacle against the ROC improvement is the excess production capacity and inventory. And the inventories are constructed by Obsolescence, Excess, and normal material inventories.

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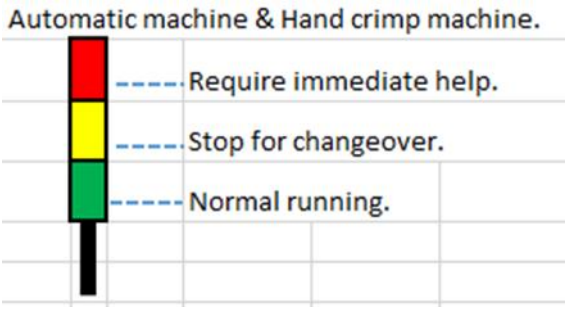
I taught factory management ***Kata*** and KPIs (Key Performance Indexes) to this management team which included the Inventory Turnover. Moreover, I taught the visual control of inventory by Red tag (Obsolescence), Yellow tag (Excess material & Work-in-progress), and no tag (normal stock) in the warehouse.

Production machines and equipment are also introduced visual control by Andon and Tags.

ANDON (From Making stream of production-11):

<u>The purpose of ANDON:</u> To recover the problem that occurred quickly and not only the understanding the process condition.

<u>Require immediate help:</u> The important thing is to take action before the process problems (Delay).



TAGS:

- *Red: Idle machine and equipment;*
- *Yellow: Regular maintenance by TPM,*

This company's ***Production-Gemba*** kept the condition of visual control including machines. And, regarding t the warehouse. The warehouse also introduced visual control through tags. However, it wasn't managed. Obsolescence stock of products & work-in-progress were gradually increasing and was not treated. Simply the yellow tags were being changed to red by the standard timing. And some normal inventories were being moved to the yellow zone by the standard timing.

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—Now I taught inventory control by Inventory turnover. —And I express my concerns— Unfortunately, the production department, which involves the warehouse, abandoned this index and management (making targets, implementation tactics, action plan, and PDCA).

—Now Inventory Turnover with this example of Manufacturing Cost report and P/L Statement:

$$Inventory\ turnover\ = \frac{Sales\ ammount}{Actual\ inventory}$$

$$Sales\ amount\ = (14)\ 38{,}250$$

$$Actual\ inventory = (3) + (12) + (18) = 3{,}250 + 104{,}750 + 104{,}550 = 212{,}550$$

$$Inentory\ Turnover = \frac{38{,}250}{212{,}550} = 0{,}18$$

Again, ***Inventory Turnover***

I got a question about the meaning of Inventory Turnover. Then I wrote the meaning of the above Note. And a little more I add more easily with this Manufacturing Cost Report and P/L Statement (Both are monthly reports, and not financial term reports.).

As the easiest example, I explain Inventory Turnover with the case of a trading company that buys goods and sells these (not using any direct cost in the company).

The word "Turnover" is used in the "Inventory Turnover ratio". "One turnover" means that all the inventory assets in stock are sold and the inventory is replaced.

The inventory turnover ratio is a measure of how many times the inventory is replaced each year (or each financial term or each month).

Consider this trading company that purchases a year's supply in bulk only once a year. The inventory figure and the annual Cost of sales figure will be equal.

This means that the company's inventory turnover rate is 1. And, it means that he buys a lot at once and gradually sells it over the course of a year. In this case, it cannot be said that the cost of procurement is being effectively utilized. (Bad cash flow)

Next, let's consider the case that purchases every month and sells out the purchased amount in that month. So, the inventory figure will be 1/12th of the cost of goods sold figure for the year.

In that way, the inventory turnover ratio is 12. Thus, a company that replaces inventories 12 times a year costs less per purchase than a company that replaces inventories only once a year.

In other words, it is a company that can circulate money well. Or, in other words, it can be said that management is more efficient. (Better cash flow than the above example case.)

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Now, the above Manufacturing Cost Report & P/L Statement company is a manufacturing company. Therefore, direct costs are used (it is the meaning of not only cost purchased).

And this Inventory Turnover is used as an important index. So, let's look at this case.

$$Inentory\ Turnover = \frac{38{,}250}{212{,}550} = 0{,}18$$

It is an index to see how many times the inventory assets are replaced in a month. And, it is 0.18 turns/month. More easily, let's look at the reciprocal number.

$$Reciprcal\ number = \frac{Actual\ inventory}{Sales\ ammount} = \frac{1}{0.18} = 5.6$$

And, it is the meaning of the necessary term of replacing inventory assets to be 5.8 months.

Somewhere, I wrote my previous company (SWS) case and the best record was 24 turns/month. It is the meaning of 1/24 months inventory (0.04 months inventory. Based on the Kanban system)

How about this Teaching Company? …The **annual** Inventory Turnover rate was 2.3 times, which means that the inventory is turned over in one year and that the goods and products are used or sold once in about 159 days (365 days ÷ 2.3).

Unfortunately, he stopped the monthly Inventory Turnover calculation. No, he wished, but couldn't, because of the bad accuracy of the computer record against the actual stock in the warehouse. Indeed, it was stupid. Thus, Cycle counting also was stopped.

3. Bankrupt by cash-flow

Backing to the consideration of the Manufacturing Cost Report and P/L Statement. To sound an alarm, I write the case of bankruptcy, even though the company is in black in P/L Statement again. This example shows the black of Operating income: (21) 3,375.

On the other hand, the total of End of term inventory material: (3) 3,250 + End of term work-in-progress cost: (12) 104,750 + End of term closing inventory products: (18) 104,750 = 212,550. And the biggest problem was these inventory amounts were increasing continuously. So, let's look at the mechanism of bankruptcy by lack of cash flow it is named Bankruptcy in Black.

The time lag of sales and purchase.

The mainstream of commercial transaction settlement is the so-called “credit transaction”. Both sales and purchases are usually settled after 1 to 3 months. In the meantime, even if sales and purchases are recorded as profits and expenses in accounting, actual cash is not received or spent. This accounting gap and cash flow will create a Bankruptcy in Black.

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P/L in Total Costing				Month: xxx1	
			Manufacturing Cost Report		
	Direct Material cost				
		1	Beginning of term inventory material	2,100	
		2	Current material purchases	17,500	
		3	End of term inventory material	**-3,250**	
		4	Total	16,350	*1+2-3*
	Direct Labor cost				
		5	Direct Labor cost	8,500	
	Indirect Manufacturing cost				
		6	Indirect material cost	375	
		7	Indirect Labor cost	1,550	
		8	Expense	3,400	
		9	Total	5,325	*6+7+8*
10	Current Total manufacturing cost			30,175	*4+5+9*
11	Beginning of term work in progress cost			103,050	*unsold*
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13	Current products manufacturing cost			28,475	*10+11-12*
P/L Statement				Month: xxxx1	
14	Sales ammount			38,250	
15	Cost of Sales				
		16	Beginning of term products inventory	103,350	
		17	Current products manufacturing cost	28,475	*10+11-12*
		18	End of term closing inventory products	-104,750	*unsold*
		19	Total	27,075	*16+17-18*
		20	Gross profit	11,175	*14-19*
		21	General and Administrative expenses		
			& selling cost	-7,600	
22	Operating income			3,575	*19-20*
23	Loss on Inventory products disposal			-100,000	
24	Loss on inventory work-in-progress disposal			-101,000	
25	Total Loss on inventory			-201,000	*22+23*
26	Adjusted Operating income			**-197,425**	*22-25*

This Teaching Company, fortunately, could money supply from his headquarter. Therefore, even though there is a money shortage between sales and purchase transactions, he could avoid bankruptcy by cash-flow lack.

By the way, Was this Teaching Company profitable (black operating income)? …Actually, the Products (Finished goods), Work-in-progress, and materials in Current Assets were increasing continuously in the Balance Sheet. And the red tags and yellow tags were increasing. Of course, the Short-term debt (to headquarters) in Current Liability also was increasing.

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Is this company actually profitable? …It is quite natural that the obsolescence products and work-in-progress must be disposed of at some time and must be accounted as Loss. If he treats such obsolescence goods monthly, he cannot be profitable in P/L Statement.

If these Obsolescence products and work-in-progress are treated (disposed of), how does the P/L Statement change? So, let's look at it by the next assumption:

- (13) End-of-term work-in-progress = 104,750. Discard 100,000. Remain: 4,750
- (18) End-of-term closing inventory products = 104,550. Discard 100,000. Remain: 4,550

When a product becomes obsolete or no longer needed, it should be discarded. Because there are extra taxes and administration costs. So what happens to the Cost of sales? …Again, let's review how the Cost of sales is calculated and what it means. The formula for Cost of sales is as follows:

Cost of sales (19) = (16) Beginning of term products inventory + (17) Current products manufacturing cost - (18) End of term closing inventory products

As I have said many times, the meaning of Cost of sales is "products sold in that period (a month in this case)". For example, if you were manufacturing car parts, it would be the parts you were able to sell to your customers. And if there is no obsolescence inventory and disposal loss, the above formula can be used to calculate exactly "products sold in that period".

However, when disposal happens, things are a little different. Because the value of the End of term closing inventory products in (18) becomes smaller, the loss on disposal will be included in the Cost of sales.

Also, if disposal losses are displayed as miscellaneous expenses or extraordinary losses below gross profit, they will be recorded twice as the cost of sales and miscellaneous expenses.

Also, if disposal losses are calculated as (for example) Extraordinary loss below Operating profit, they will be recorded twice as cost of sales and miscellaneous expenses.

Then how to handle it? …The conclusion is as follows.

- On the P/L Statement, firstly calculate the Cost of sales based on book inventory (amounts before disposal).
- Once the “Cost of sales in the current period” is displayed on the P/L Statement, and then the amount of disposal losses are displayed.

P/L
Sales Amount
Cost of Sales
Gross Margin
Selling Expenses
General and Administrative Expense
Operating Profit
Non-Operating Income
Non-Operating Expense
Ordinary Profit
Extraordinary income
Extraordinary loss
Tax
Net Profit

Please imagine the Teaching Company that had many red tag inventories of (12) Work-in-Progress and (18) Finished goods (Products). Then they decided to treat these 100,000 in each of them.

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And it is natural that the amounts of (12) 4,750 after disposed of, and (18) 4,550 after disposed of, are described in next month's (11) Beginning of term work-in-progress cost and (16) Beginning of term products inventory.

Based on the above information, please read the conversation with this Teaching Company in the next paragraphs.

Firstly intervened the Accounting Manager with a disgusted face —It is not enough to understand or analyze just P/L Statement and necessary to analyze the balance sheet. Everyone —he called their attention—. You can understand the Balance sheet, can you? …The ***Sensei*** pointed out the concern of the Assets side. We have so many obsolescences (dead) stocks which evaluated as assets. And for financing it, it is necessary to gain money on the Liability side. This is financed with borrowed money from headquarters. It is quite true our company has the risk of cash-flow shortage.

P/L in Total Costing		Momth; xxxx1	
	Manufacturing Cost Report-1		
Direct Material cost			
	1.Beginning of term inventory material	2100	
	2.Current material purchases	17500	
	3. End of term inventory material	**3250**	
	4. total	16350	1+2-3
Direct Labor cost			
	5.Direct Labor cost	8500	
Indirect Manufacturing cost			
	6.Indirect material cost	375	
	7. Indirect Labor cost	1550	
	8. Expense	3400	
	9. total	5325	6+7+8
10. Current Total manufacturing cost		30175	4+5+9
11. Beginning of term work in progress cost		103050	unused
12. End of term work-in-progress cost		**104750**	unused ← Describe as is
13. Current products manufacturing cost		28475	10+11-12
	P/L Statement-1	Month; xxxx	
14. Sales Amount		38250	
15. Cost of Sales			
	16. Beginning of term products inventory	103350	
	17. Current products manufacturing cost	28475	10+11-12
	18. End of term closing inventory products	**104550**	unsold ← Describe as is
	19. total	27275	16+17-18
20. Gross profit		10975	14-19
21. General and administrative expenses & Selling cost		7600	
	22. Operating income	3375	19-20
	23. Loss on inventory products disposal	100000	] Deal in here
	24. Loss on inventory work-in-progress disposal	101000	
	24. Total Loss on inventory	201000	22+23
25. Adjusted Operating income		**-197625**	21-22

—And… —The Engineering Manager talked hesitatingly —. And what can we do?

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I felt, unfortunately, this is the level of accounting knowledge of a middle-class company's manager. And even so now we are reviewing the analysis result of Policy Control in Factory Management Checklist. Why is such a very basic issue discussed?

—Everyone —I intervened—. I believe Mr. Accountant Manager already lectured about the pitfall of the monthly P/L Statement. Mr. Engineering Manager, don't you remember?

To complete the Policy management story (from Philosophy, and strategy to annual policy and annual action plan), following and confirming the result of the action plan in the monthly P/L statement is essential. However, following with just a monthly P/L statement is never sufficient. Therefore, we introduced the system of Inventory Turnover ratio.

—As Mr. Accounting Manager told you, only the P/L Statement is not sufficient to understand the company's circumstances. Balance Sheet and at least Manufacturing Cost Report are essential. However —I pointed out—, and probably you felt it a little difficult to refer to these. Therefore, I recommended using P/L Statement with Inventory Turnover.

—Mr. Engineering Manager —say the Accounting Manager— You are the engineering manager and in charge of design engineering. Your position is very important because most of the cost is determined at the stage of design. Therefore, you need to be more sensitive against the P/L Statement also Cost Composition.

When I was hearing that speech I felt that rather than the Engineering Manager, the Production Manager should realize it. I guessed that the Accounting Manager might consider the position of Production Manager. Even so what an undependable person is.

—If you use the balance sheet in addition to the P/L Statement for financial analysis, you can check cash flow, soundness, and stability. Based on the analysis results, by using it, it is necessary to manage a factory.

Continuing the explanation of the Accounting Manager about Soundness and stability.

Soundness and Stability

It is the contents of Current assets and Current liabilities. If explained simply and easily, Current assets, these are that can be realized within one year from the balance sheet date. Current liabilities are liabilities that must be paid within one year in principle.

The Current Ratio and Quick Ratio:

$$Current\ Ratio = \frac{Current\ assets}{Current\ liability}\ x\ 100$$

$$Quick\ Ratio = \frac{Cash\ and\ cash\ equivalents}{Current\ liabilityies}\ x\ 100$$

The Quick Ratio is calculated excluding inventories that may or may not be converted into cash. So unlike the Current Ratio there is no need to worry about unsold inventory (of finished goods, work-in-progress, and materials), but accounts receivable are included in the calculation.

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$$Current\ assets = Cash\ and\ cash\ equivalent + inventories$$

- ***Current assets:*** *These refer to assets with high liquidity, and refer to highly liquid assets such as cash and deposits, excluding inventories whose liquidity is uncertain.*
- ***Current liabilities:*** *Notes payable, Accounts payable, Short-term debts, Accounts payable (Arrears), Accrued expenses, Advance receipts, and Deposits*

—Mr. Engineering Manager —Asked the Accounting Manager—. Our company is in a bad situation of these ratios.

The Engineering Manager was not able to answer that question, but only babbling.

—Mr. Engineering Manager —I intervened—, you understand the word of cash-flow, do you? …Simply, your company lack of money.

—But Mr. Kimura —answered the Engineering Manager—. When looking at the condition of factory efficiency in labor and machine performance, both show good results. Am I right? —and he continued—. Moreover, recently, the quality issue also becoming better. Our factory seems to be booming. What is the problem?

—Mr. Engineering Manager and everybody —The Accounting Manager pointed out—. Our company is in crisis by 3 risks. One is the cash-flow issue. Another is the recent p/L. In the last 3 months, our P/L situation fell in red, even though the factory is booming.

—Well, Fell in red!? —he pointed—…No, not yet. We need to deal with the red tag inventory of products and work in progress within 3 months. And firstly, we deal with (dispose of) whatever amount of money. The amount will cancel out or over the operating profit until now…

—Our company is never in a profitability situation. —The Accounting Manager expressed disappointment—. I have told you before, have I? …And the biggest issue is the decline in sales amount. Now the sales volume cannot recover the fixed cost.

P/L Statement Pitfall

—Everyone. —The Accountant Manager seriously talked—. Please remember 3 words which are "cash-flow", "Bankruptcy in the Black" and “P/L Statement to show only the cost of sales and profit”…

…One of the reason why a company goes bankrupt is that even if it is in the black on the P/L Statement, the actual cash flow is not turning around. Even though the P/L Statement shows profitability, if there is no cash against necessary payment, a company is bankrupt.

In the P/L Statement, purchase costs are recorded when the finished goods are sold. (Hence the term “Manufacturing cost: Cost of sales”). A P/L Statement shows the Cost of sales and profit of only what is sold.

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The entire amount spent to purchase parts and materials is not an expense (Cost, Expense). The number of parts and materials purchased becomes an expense only when they are sold. So, what happens to the portion that has not yet been sold? …The purchase amount of goods that have not been sold and are simply stored in the warehouse is not an expense. This is called "inventory assets"

For example, suppose that materials and parts purchased in large quantities sell only a little. Also, suppose that the product is no longer expected to sell even though it has been manufactured. The only expense that can be charged to the Cost of sales is the purchase price of the goods sold.

On the other hand, from a "money" perspective, you have paid for the purchase of a large number of goods. Therefore, even if the company is "in the black" in terms of accounting, it has spent a large amount of money on payments and can find itself in a situation where it has a "lack of money (cash)".

Furthermore, what happens if the purchased goods and finished goods remain in the warehouse unsold indefinitely? …In time, they may become damaged, deteriorated, design changed and no longer for sale, or lost. In addition, for accounting purposes, the calculation of the cost of sales excludes the portion of inventory at the end of the period that has not been sold.

$$\boldsymbol{Cost\ of\ sales} = Inventory\ at\ the\ beginning\ of\ the\ period + Purchases\ at\ the\ end\ of\ the\ period - Inventory\ at\ the\ end$$

There is the time lug for finished goods sold and payment of purchasing or other debt payable.

Yes, we are facing bankruptcy. No, it is not a suitable word. Correctly, we have already been bankrupted, if there is no borrowing money from headquarters.

The time lag. The debt payable is very quick, but the income from selling products is slow. And also, a more serious problem is the time lag between expenses incurred such as purchasing materials and labor cost of production, and income by products sold.

—Kimura Sensei lectured us about the Toyota JIT —explained them the Accounting Manager—. But our situation is too far from this theory. The products produced are stocked in the warehouse. And we are just looking at the situation of piling up the dead stock. Not only the dead stock of finished goods but also the excess materials and work-in-progress also become serious issues.

—After Kimura Sensei left, the disease returned. Then our headquarter decided to introduce an additional KPI (Key Performance Index) which is ROC (Return on Capital).

In short, he was explaining to all the managers the reality of "Bankruptcy in Black", even though the P/L Statement is profitable. So, please remember, the main theme of that meeting is to review the factory management and level improvement by Factory Management Checklists.

—It is my surprise. Our company is in red!? —The Engineering Manager asked—. The P/L Statement shows "black". But you are telling us that our company is in red and is becoming bankrupt.

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—Last time after the strategy of in-house production —began again the Accounting Manager, now with a bitter face—, disposed of the half volume of old obsolescence and excess materials and did the accounting treatment. However, the disease recurred. Again the red tags and yellow tags are increasing. Why? …Why do we produce unnecessary products while knowing to dispose of these?

—Mr. Production Planning Manager —The Accounting Manager pointed him out—. Please stop unnecessary production orders to the Production department, and Mr. Production Manager, please stop unnecessary production.

In the meantime, the Production Planning Manager hesitatingly babbled, and the Production Manager, just a little emotionally said —there are 3 reasons! …Please never forget that there is an important task which is to keep current capacity for future business. Secondly, if keep the production capacity, I need to keep the production at good efficiency. And, thirdly, increasing red tags (obsolescence products) is not my responsibility, but the responsibility of the Sales department. I can keep good efficiency, can I? —The Production Manager asked the Accounting Manager finally.

—Good efficiency? —I questioned while the Accounting manager looked at me with an exhausting expression— No, completely not at all.

—Mr. Production Manager —I insisted—. You are in the management position of a management team member. If you are a Gemba supervisor or leader, it is acceptable or is necessary to use the index of labor efficiency the formula is production output x ST/Working hour. However —I felt, unfortunately, and for this company—, you are a management team member. Then you need to use the labor efficiency index which is:

$$Labor\ Efficiency\ Index = \frac{Products\ sold\ x\ ST\ (Standard\ Time)\ x\ 100}{Working\ Hour}$$

Based on this calculation, your labor efficiency is less than 60%. But, Line labor efficiency has used the formula of:

$$Line\ Labor\ Efficiency\ Index = \frac{Products\ produced\ x\ ST\ (Standard\ Time)\ x\ 100}{Working\ Hour}$$

—Line labor efficiency has used the formula of You can understand, can you? —I asked them and I told to the Engineering Manager—. Your factory is never good at efficiency and profitability. Understood? …Moreover, Mr. Production Manager, you induce other Mudas which are an accumulation of Obsolescence products, excess material purchases, ***Muda*** tax, and ***Muda*** control cost.

—Mr. Production Planning Manager —I asked— Why do you make a production plan which is to produce excess products? —and I answered—. Last time we discussed it, did we?

—Kimura —Told me the Production Manager, in the meantime, I thought I was used to the production manager calling me only Kimura, as some kind of contempt—. I have a responsibility to keep good labor and machine performance, because of our company's

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policy. Therefore, we need to keep producing. The thing which must be criticized is sales expansion which is also one of the top policies, isn't it?

—Mr. Production and Mr. Production Planning Manager —I insisted—. It is my last suggestion against your management style for keeping excess production. I made the same suggestion last time. So, pursue small lot production by small production plan and frequent changeover. And, start the SMED method development.

$$Labor\ Efficiency\ Index = \frac{Products\ sold\ x\ ST\ (Standard\ Time)\ x\ 100}{Working\ Hour}$$

—Pursue small lot production by small production plan and frequent changeover. Start the SMED method development. —And I repeated the formula…

I repeated another time, three in total to be clear what is the way of work. And finally, I asked both Production Manager and Production Planning Manager —Is it understood Messrs. Production and Planning Managers? —I finished not without the hesitations and disappointing faces of both.

—Mr. Managing Director —I express my concerns directly to him—. I thought it is very sorry because such a very basic issue couldn't be kept. Then, I need to suggest the next: two things Please add one thing which is No excess production & No excess procurement as per your policy. And another suggestion which is not my matter, because my task is only TQM, stop the stupid policy (Prohibition of Receiving order in red).

The last point will be described in the next lesson.

And the battle debate was continued at the first check item (Policy Control). And this review meeting seemed to be a longer time to be required. Then, this theme (Factory Management Check including Employee's Engagement Check) will be continued next.

V. Next Lecture.

Thinking environment (a little more).

Cost control-7: Direct Costing P/L Statement and my P/L Statement.

Teaching Company.

Koichi Kimura, CC4 – March – 2022.

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